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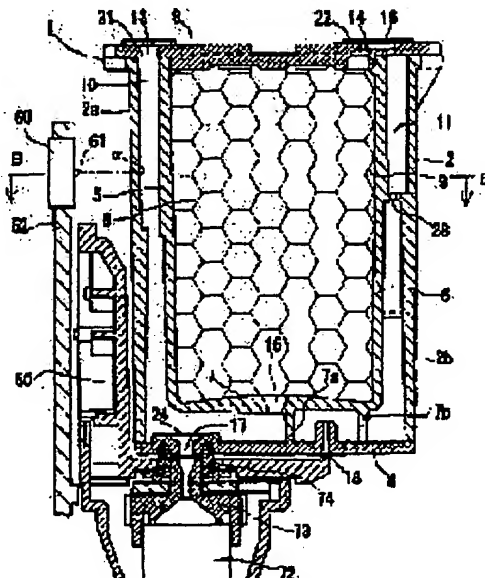
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(54) INK CARTRIDGE AND MECHANISM FOR DETECTING RESIDUAL QUANTITY OF INK

(57)Abstract:

PROBLEM TO BE SOLVED: To fill a case efficiently with ink while enhancing workability by performing the ink filling work and sealing work of case opening from one side of the case.

SOLUTION: An ink filling opening 13 communicating with a second chamber 10 and a pressure reducing opening 14 communicating with a first chamber 9 are arranged on one side of a case 2 and both chambers 9, 10 are interconnected on the other side through an interconnecting hole 15. Since the ink filling opening 13 and the pressure reducing opening 14 are arranged on one side of the case, and ink filler and a pressure reducing unit are simply required to be brought close to the case 2 and thereby the workability of ink filling work and case opening sealing work is enhanced. Furthermore, ink can be filled efficiently because it is passed sequentially through the second and first ink chambers 10, 9.



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CLAIMS

[Claim(s)]

[Claim 1] The ink cartridge which holds the ink which is characterized by providing the following, and which is supplied to a recording head. The case which opened at least one field wide. The 1st locus which hold the porosity material in which partition formation was carried out by the bridge wall into the aforementioned case, and which absorbed ink under opening to the open field side of a case, respectively, and the 2nd locus which hold ink. It is wrap covering device material about the open field of the 1st locus of the above, and the 2nd locus. The ink restoration mouth for being formed in the open field of either the 1st locus of the above, or the 2nd locus, and filling up the 1st locus of the above, and the 2nd locus with ink, And the 1st locus of the above or the 2nd locus is the run through-hole which opens a reduced pressure mouth connectable with the source of reduced pressure, and the 1st locus of the above and the 2nd locus for free passage mutually by the opposite side the open aforementioned field side in order to be formed in the open field of another side and to decompress the 1st locus of the above, and the 2nd locus either.

[Claim 2] The aforementioned case is an ink cartridge characterized by having the ink feed hopper which supplies the ink of the 1st locus of the above, or the 2nd locus to the field where the aforementioned open fields differ in an ink cartridge according to claim 1 at a recording head.

[Claim 3] It is the ink cartridge characterized by, as for the aforementioned case, also opening the aforementioned open field and an opposite side wide, forming the aforementioned ink restoration mouth and a reduced pressure mouth in the aforementioned covering device material in an ink cartridge according to claim 2, respectively, and forming the aforementioned ink feed hopper in the covering device material of a wrap 2nd in the open field of an opposite side.

[Claim 4] the air free passage which the covering device material of the above 2nd opens for free passage to the 1st locus of the above in an ink cartridge according to claim 3 -- the ink cartridge characterized by having a hole

[Claim 5] In order to decompress the inside of the ink restoration mouth for filling up the 1st field of the case having ink with ink in this case in the ink cartridge which holds the ink supplied to a recording head, and this case, Form a reduced pressure mouth connectable with the source of reduced pressure, and the ink feed hopper which supplies ink to a recording head is formed in the 2nd field of it and an opposite side. The ink cartridge characterized by having blockaded in the 1st sealant which stuck the aforementioned ink restoration mouth and the reduced pressure mouth on the 1st field of the above, and blockading in the 2nd sealant which stuck the aforementioned ink feed hopper on the 2nd field of the above possible [ablation].

[Claim 6] the air free passage for which the 2nd field of the above opens the inside and outside of the aforementioned case for free passage further in an ink cartridge according to claim 5 -- a hole -- having -- the 2nd sealant of the above - - the aforementioned air free passage -- the ink cartridge characterized by blockading a hole possible [ablation]

[Claim 7] The ink cartridge which holds the ink which is characterized by providing the following, and which is supplied to a recording head. The case which opened at least one field wide. The atmosphere besides the aforementioned case, and the air free passage way which opens an end for free passage to an opposite close-attendants side in the aforementioned ink interior of a room, and opens the other end for free passage with an open field side while opening to the open ink room [in which partition formation is carried out by the bridge wall into the aforementioned case, it opens wide to the open field side of the aforementioned case, and ink is held], and field side of a case. It is wrap covering device material about the open field of the aforementioned ink room at least. The ink feed hopper for it being open for free passage in the aforementioned ink room, and supplying ink to a recording head formed in the aforementioned covering device material.

[Claim 8] the air free passage to which the aforementioned covering device material is a wrap thing, and opens the open field of the aforementioned ink room and the aforementioned air free passage way for free passage with the air free passage way in an ink cartridge according to claim 7 -- the ink cartridge characterized by having a hole

[Claim 9] The ink cartridge which holds the ink which is characterized by providing the following, and which is supplied to a recording head. The case which opened two fields which counter wide. The air free passage way which opens for free passage the ink room in which partition formation is carried out by the bridge wall into the aforementioned case, it opens wide to both the opening side side of a case, respectively, and ink is held, and this ink room with the atmosphere besides the aforementioned case. 1st covering device material with which leaves the path which opens the aforementioned ink room and an air free passage way for free passage, is wearing one field of the aforementioned case, and it is equipped. The ink feed hopper for it being open for free passage in the aforementioned ink room formed in the 2nd covering device material with which covers the aforementioned ink room and it is equipped, and the covering device material of the above 2nd, and supplying ink to a recording head at least, in the field of another side of the aforementioned case.

[Claim 10] It is the ink cartridge characterized by having had the 1st locus which held the porosity material with which the aforementioned ink room was further divided by the bridge wall in the ink cartridge according to claim 9, and which absorbed ink, and the 2nd locus which have not held this porosity material, having covered the 1st locus of the above, or the 2nd locus by the covering device material of the above 1st, and having covered another side by the 2nd covering device material.

[Claim 11] It is the ink cartridge characterized by being open for free passage with the 2nd locus of the above by this air free passage way and opposite side, and the 2nd locus of the above being open for free passage with the aforementioned ink feed hopper in an ink cartridge according to claim 10 while the 1st locus of the above are open for free passage with the aforementioned air free passage way.

[Claim 12] In the ink cartridge which holds the ink supplied to a recording head In the case which constitutes this cartridge, by the unilateral wall and the bridge wall formed mostly at parallel The 1st locus which hold ink, and the 2nd locus for being mostly arranged with the aforementioned side attachment wall at parallel, and filling up these 1st locus with ink, While forming the air free passage way for being mostly arranged with the aforementioned side attachment wall at parallel, and opening these 1st locus for free passage with the atmosphere besides the aforementioned case and opening the end of the 2nd locus of the above for free passage in the end section of the 1st locus of the above The ink cartridge characterized by opening the other end wide to the atmosphere besides the aforementioned case while opening the other end wide out of the aforementioned case through an ink restoration mouth and opening the end of the aforementioned air free passage way for free passage at the free passage section with the 2nd locus of the 1st locus of the above, and the edge of an opposite side.

[Claim 13] It is the ink cartridge characterized by locating the aforementioned air free passage way and the 2nd locus along with the side attachment wall of the opposite side of the aforementioned case in an ink cartridge according to claim 12, respectively.

[Claim 14] It is the ink cartridge which the 2nd locus of the above have an ink feed hopper for supplying ink to a recording head near the free passage section with the 1st locus of the above in an ink cartridge according to claim 12, and is characterized by supplying the indoor ink of the above 1st to a recording head from the aforementioned ink feed hopper through the 2nd locus of the above.

[Claim 15] In an ink cartridge according to claim 14 the 1st locus of the above It is covered by the 1st covering device material while being wide opened in the aforementioned side attachment wall and the right-angled end side. the 2nd locus of the above The ink cartridge which is covered by the 2nd covering device material and characterized by forming the aforementioned ink feed hopper in the covering device material of the above 2nd while being wide opened in the other end side of the aforementioned end and an opposite side.

[Claim 16] The ink cartridge which holds the ink which is characterized by providing the following, and which is supplied to a recording head. The case where open vertical ends wide and it has two side attachment walls which counter. The 1st and 2nd bridge walls mostly prolonged in parallel with the aforementioned both-sides wall in the aforementioned case. Connect with the soffit of both the bridge wall, and partition formation is carried out by the soffit opening side of the aforementioned case, and the 3rd bridge wall mostly prolonged in parallel. this -- the 1st locus located between the upper-limit opening sides of the 1st and 2nd bridge walls, the 3rd bridge wall, and the aforementioned case, the 2nd locus located between one side attachment wall and the 1st bridge wall, and the air free passage way located between the side attachment wall of another side, and the 2nd bridge wall The ink feed hopper which is wearing the 1st covering device material which was wearing the upper-limit opening side of the above 1st, and fixed in the aforementioned case, and the soffit opening side of the aforementioned case, is open for free passage with the soffit of the 2nd locus of the above, and supplies ink to a recording head.

[Claim 17] the air free passage which the covering device material of the above 1st is open for free passage to the 2nd locus of the above, has an ink restoration mouth for filling up the above 1st and the 2nd locus with ink in an ink cartridge according to claim 16, and the covering device material of the above 2nd opens for free passage on the

aforementioned air free passage way -- the ink cartridge characterized by having a hole

[Claim 18] The ink cartridge which holds the ink which is equipped with the following and characterized by making a part of side attachment wall of the 2nd locus transparently or translucent at least, and which is supplied to a recording head. The 1st and 2nd locus in which partition formation is carried out by the bridge wall and which hold ink in the case which constitutes this cartridge. The run through-hole which opens the above 1st and the 2nd locus for free passage mutually in the lower part. it forms in the upper limit of the 2nd locus of the above -- having -- the aforementioned free passage from the 2nd ink room -- pass a hole -- the ink restoration mouth for filling up the 1st locus of the above with ink the seal member which blockades the aforementioned ink restoration mouth, the ink feed hopper which is formed in the soffit of the 2nd locus of the above, and supplies ink to a recording head, and the air free passage which opens the 1st locus of the above for free passage to the atmosphere -- a hole

[Claim 19] It is the ink cartridge characterized by having the porosity material which the 1st locus of the above have larger capacity than the 2nd locus of the above in an ink cartridge according to claim 18, and absorbed ink.

[Claim 20] It is the ink cartridge characterized by covering the upper limit of the 1st locus of the above, and the 2nd locus by one covering device material in an ink cartridge according to claim 19, and forming the aforementioned ink restoration mouth in the covering device material.

[Claim 21] The ink cartridge characterized by having the concave protruding line to which the inside of the transparent or translucent portion of the side attachment wall of the 2nd locus of the above extends in the vertical direction in an ink cartridge according to claim 18.

[Claim 22] It is the ink residue detection mechanism in which a sensor detects the ink in the ink cartridge which held the ink supplied to a recording head which is equipped with the following and characterized by the aforementioned sensor carrying out opposite arrangement with the transparent or translucent portion of the side attachment wall of the 2nd locus. The aforementioned ink cartridge is the case which has the 1st and 2nd locus in which partition formation is carried out by the bridge wall, and which hold ink inside, and made a part of side attachment wall of the 2nd locus transparently or translucent at least. The run through-hole which opens the above 1st and the 2nd locus for free passage mutually in the lower part. it forms in the upper limit of the 2nd locus of the above -- having -- the aforementioned free passage from the 2nd ink room -- pass a hole -- the ink restoration mouth for filling up the 1st locus of the above with ink the seal member which blockades the aforementioned ink restoration mouth, the ink feed hopper which is formed in the soffit of the 2nd locus of the above, and supplies ink to a recording head, and the air free passage which opens the 1st locus of the above for free passage to the atmosphere -- a hole

[Claim 23] It is the ink residue detection mechanism characterized by carrying out opposite arrangement with the ridgeline portion prolonged in the vertical direction formed when the 2nd [at least] page to which the aforementioned sensor makes the inside of the 2nd locus of the above in an ink residue detection mechanism according to claim 22 crosses.

[Claim 24] It is the ink residue detection mechanism characterized by for the aforementioned sensor having a light-emitting part and a light sensing portion in an ink residue detection mechanism according to claim 22, and having the concave protruding line prolonged in the direction which intersects perpendicularly with the flat surface in which the inside of the transparent or translucent portion of the side attachment wall of the 2nd locus of the above contains the light-emitting part of the aforementioned sensor and a light sensing portion, and the detecting-element grade of the 2nd locus by the aforementioned sensor.

[Claim 25] The ink cartridge which has the ink room in which the ink supplied to a recording head was held inside. The sensor which detects the ink of this ink interior of a room. It is characterized by to set it as the ridgeline portion which is the ink residue detection mechanism equipped with the above, and is prolonged in the vertical direction formed when the 2nd [at least] page which makes the inside of the aforementioned ink room for the detecting-element grade by the aforementioned sensor crosses, while carrying out opposite arrangement of the aforementioned sensor at the side prolonged in the vertical direction of the case which constitutes the aforementioned ink cartridge.

[Claim 26] It is the ink residue detection mechanism characterized by for the aforementioned case countering nothing and its one ridgeline in a rectangle mostly in a flat surface in an ink residue detection mechanism according to claim 25, and forming the aforementioned sensor.

[Claim 27] It is the ink residue detection mechanism which constitutes the side attachment wall of the aforementioned case in the aforementioned detecting-element grade by transparency or translucent material in an ink residue detection mechanism according to claim 25, and is characterized by the bird clapper from the light-emitting part which the aforementioned sensor countered the ridgeline portion and was formed, and a light sensing portion.

[Claim 28] It is the ink residue detection mechanism according to claim 25 which is equipped with the following and characterized by forming the aforementioned sensor so that the ink residue of the 2nd locus of the above may be detected. The aforementioned cases are the 1st locus which hold the porosity material which absorbed ink and are in

the atmosphere and a free passage state. The 2nd ink room which was open for free passage to the 1st locus, held only ink, and sealed the upper part.

[Claim 29] The ink cartridge characterized by to have the concave protruding line prolonged in the direction in which the flat surface containing the light-emitting part and the light sensing portion, and the aforementioned detecting-element grade of the aforementioned reflected light sensor and the inside of the side attachment wall of the aforementioned ink room which is the detecting-element grade by the aforementioned reflected light sensor cross at right angles in the ink cartridge by which the ink of the aforementioned ink interior of a room is detected by the reflected light sensor which has the ink room in which the ink supplied to a recording head was held inside, and has a light-emitting part and a light sensing portion.

[Claim 30] The ink cartridge characterized by having the concave protruding line prolonged in an ink cartridge according to claim 29 in the flat surface in which the external surface of the side attachment wall of the aforementioned ink room which is the detecting-element grade by the aforementioned reflected light sensor contains the light-emitting part of the aforementioned reflected light sensor and a light sensing portion, and the detecting-element grade by the aforementioned reflected light sensor, and parallel.

[Claim 31] It is the ink cartridge by which an ink residue is detected by detecting by the reflected light sensor which has the light-emitting part and light sensing portion which were installed in the outside of this ink room in the existence of the ink of the ink interior of a room which holds ink. The ink cartridge characterized by fabricating the field corresponding to the inside of the side attachment wall of the aforementioned ink room which is the detecting-element grade by the aforementioned reflected light sensor using the metal mold polished in the direction which intersects perpendicularly with the flat surface containing the light-emitting part of the aforementioned reflected light sensor and a light sensing portion, and the detecting-element grade of the aforementioned case main part.

[Claim 32] The ink cartridge characterized by forming the field corresponding to the external surface of the side attachment wall of the aforementioned ink room which is the detecting-element grade by the aforementioned reflected light sensor in an ink cartridge according to claim 31 using the flat surface containing the light-emitting part of the aforementioned reflected light sensor and a light sensing portion, and the detecting-element grade by the aforementioned reflected light sensor, and the metal mold polished by parallel.

[Claim 33] While forming the 1st locus by which the porosity material which absorbed ink is contained in the case which constitutes this cartridge in the ink cartridge which holds the ink supplied to a recording head the air free passage which carries out opening of the 1st locus of the above to the atmosphere besides the aforementioned case through a path -- a hole -- open for free passage -- the edge of the internal surface of the 1st locus of the above -- the aforementioned path and an air free passage -- the ink cartridge characterized by having been placed between the hole and connecting ***** with it

[Claim 34] The ink cartridge according to claim 33 characterized by providing the following. By the bridge wall, they are the 1st locus of the above in the aforementioned case. The air free passage way which opens a hole for free passage is formed, and opening of the 1st locus and an air free passage way is covered by covering device material. the aforementioned path and the aforementioned air free passage -- to the aforementioned covering device material The aforementioned path which opens the 1st locus of the above, and an air free passage way for free passage to the field of the covering device material of an opposite side with the aforementioned bridge wall while forming in the position distant from the aforementioned bridge wall the wall jutted out over the 1st locus side rather than the inside of the 1st locus of the above.

[Claim 35] In an ink cartridge according to claim 33, further, the 1st locus of the above are covered and it has the covering device material which equips the field of an opposite side with the aforementioned path with these 1st locus. to this covering device material The wall jutted out inside the 1st locus rather than the plane of composition of the aforementioned covering device material and the aforementioned case is formed in the position distant from the inside of the 1st locus of the above. And the ink cartridge which forms opening for opening the aforementioned path for free passage to the 1st locus of the above in the position distant from the inside of the 1st locus of the above, and is characterized by having held where the aforementioned porosity material is pressed with the aforementioned wall of the aforementioned covering device material at the 1st locus of the above.

[Claim 36] The ink cartridge which forms the ink room which holds ink in the case which constitutes this cartridge in the ink cartridge which holds the ink supplied to a recording head, and the air free passage way which open the ink room for free passage to the atmosphere besides the aforementioned case, and is characterized by to prepare an ink reservoir in a low position rather than the ink room side opening edge of the through hole while preparing the through hole which opens the aforementioned ink room and the atmosphere for free passage on the aforementioned air free passage way.

[Claim 37] It is the ink cartridge characterized by forming the aforementioned through hole and an ink reservoir in one

wall, and for the upper limit of the aforementioned through hole and an ink reservoir having a level difference, and forming them in an ink cartridge according to claim 36.

[Claim 38] In the ink cartridge which holds the ink supplied to a recording head In the case which constitutes this cartridge, by the unilateral wall and the bridge wall formed mostly at parallel The ink room in which ink is held, and the air free passage way which opens the ink room for free passage to the atmosphere besides the aforementioned case are formed. The through hole which opens the aforementioned ink room and the atmosphere for free passage in the wall which forms the vertical ends of the aforementioned air free passage way in an open state, leaves the path which opens the aforementioned ink room and an air free passage way for free passage for the upper limit of the aforementioned case, covers by covering device material, and divides the middle of the aforementioned air free passage way, The ink cartridge characterized by forming a low ink reservoir rather than the upper limit of the through hole.

[Claim 39] In the ink cartridge which holds the ink supplied to a recording head The ink room which holds ink in the case which constitutes this cartridge, The ink feed hopper which forms the air free passage way which opens the ink room for free passage to the atmosphere besides the aforementioned case, and supplies the ink of the aforementioned ink interior of a room to the inferior surface of tongue of the aforementioned case at a recording head, the air free passage which opens the aforementioned air free passage way to the atmosphere -- the covering device material in which the hole was formed -- equipping -- the upper surface of the aforementioned covering device material -- the aforementioned air free passage -- the ink cartridge characterized by forming a low ink reservoir from the upper limit of a hole

[Claim 40] The ink cartridge which holds the ink which is characterized by providing the following, and which is supplied to a recording head. The 1st locus which hold the porosity material which absorbed ink by the bridge wall in the case which constitutes this cartridge. the free passage prepared in the lower part of the 1st locus -- the ink feed hopper which forms the 2nd locus which are open for free passage through a hole, and hold ink, and supplies ink to a recording head at the 2nd locus of the above -- preparing -- the aforementioned free passage -- the shortest-path top which connects a hole and the aforementioned ink feed hopper -- an obstruction

[Claim 41] The ink cartridge characterized by having formed in the state where the 2nd locus of the above were wide opened at the end of the aforementioned case, in the ink cartridge according to claim 40, and forming the aforementioned obstruction in either of the aforementioned bridge walls which form the aforementioned ink feed hopper in wrap covering device material, and counter the open field at the aforementioned covering device material and it.

[Claim 42] It is the ink cartridge characterized by locating the aforementioned obstruction in the 1st portion of the above by the 2nd locus of the above consisting of the 1st portion located under the 1st locus of the above, and a portion which is the 2nd located between the side of the 1st locus, and the side attachment wall of the aforementioned case in an ink cartridge according to claim 41, and carrying out opening of the aforementioned run through-hole to the 1st portion of the above.

[Claim 43] The portion which constitutes the ceiling side of the 1st portion of the 2nd locus of the above in the bridge wall between the above 1st and the 2nd locus in an ink cartridge according to claim 42 is an ink cartridge characterized by inclining so that it may go up toward the 2nd portion.

[Claim 44] The ink room which held ink in the case which constitutes this cartridge in the ink cartridge which holds the ink supplied to a recording head, and this ink room are an ink cartridge characterized by forming the space which was not open for free passage and was open for free passage to the case exterior.

[Claim 45] It is the ink cartridge characterized by being equipped with covering device material so that the open end side of this case may be worn, forming the aforementioned space of this covering device material and the aforementioned bridge wall, and preparing puncturing which opens this space for free passage with the case exterior in this covering device material while partition formation of the aforementioned ink room is carried out by the bridge wall into the aforementioned case in an ink cartridge according to claim 44 and the end of this case is formed at an open state.

[Claim 46] The ink cartridge characterized by the reduced pressure space and the bird clapper for the aforementioned case being enclosed with a sealing packing bag in the state of reduced pressure, and the aforementioned space maintaining the reduced pressure state in a packing bag in an ink cartridge according to claim 44.

[Claim 47] In an ink cartridge according to claim 45 the aforementioned ink room It consists of the 1st locus which hold the porosity material which absorbed ink, and the 2nd locus which are open for free passage through a run through-hole to the 1st locus, are covered by the aforementioned covering device material, and hold ink. the aforementioned covering device material It is the ink cartridge which has an ink feed hopper for supplying ink to the aforementioned recording head from the 2nd locus of the above, and is characterized by adjoining and forming the

aforementioned space in the 2nd locus of the above.

[Claim 48] In an ink cartridge according to claim 45 in the aforementioned case In an end, it is open for free passage with the aforementioned bridge wall in the aforementioned ink room and this ink room, and the atmosphere besides the aforementioned case and an air free passage way open for free passage are formed in the other end. the aforementioned covering device material It is the ink cartridge which has a run through-hole for opening the aforementioned air free passage way for free passage to the atmosphere, and is characterized by adjoining and forming the aforementioned space in the aforementioned air free passage way.

[Claim 49] In an ink cartridge according to claim 44 in the aforementioned case While it is open for free passage in an end in the aforementioned ink room and this ink room, the atmosphere besides the aforementioned case and an air free passage way open for free passage are formed in the other end of a bridge wall and the end of the aforementioned case is formed in an open state of it It is equipped with covering device material so that the open end side of this case may be worn. to this covering device material The ink feed hopper for supplying ink to the aforementioned recording head from the aforementioned ink room, A hole is formed. and the air free passage for opening the aforementioned air free passage way for free passage to the atmosphere -- Moreover, the aforementioned space is formed of the aforementioned covering device material and the aforementioned bridge wall, and it is blockaded by the seal member in which an air run through-hole can exfoliate with the aforementioned ink feed hopper. The ink cartridge which sealing enclosure of the aforementioned case is carried out in the state of reduced pressure at a packing bag, and is characterized by the reduced pressure space and the bird clapper for the aforementioned space maintaining the reduced pressure state in a packing bag.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the ink residue detection mechanism of the ink cartridge which holds the ink supplied to the recording head in image formation equipment, and this ink cartridge.

[0002]

[Description of the Prior Art] Conventionally, image formation equipments, such as a printer of an ink-jet method, make an ink drop blow off from the nozzle of the recording head carried on carriage, and record a picture on a record medium, and jet of an ink drop is performed by driving actuators, such as an electric machine sensing element arranged by the recording head or an electric thermal-conversion element, and generating a pressure wave. Although ink is supplied from the ink cartridge carried in a recording head free [exchange], if air bubbles are mixing into the ink liquid supplied from an ink cartridge, having a bad influence on ink injection from the nozzle of a recording head is known.

[0003] the air free passage which is open for free passage with the atmosphere so that air may flow into a recording head at an ink cartridge corresponding to reduction by the ink feed hopper which supplies ink, and consumption of ink -- it has a hole Then, after filling up ink with the manufacturing process of an ink cartridge, each of these openings is made a closure state by the closure member. Moreover, what is done in the state of reduced pressure into a packing bag for the sealing hold of the ink cartridge which held ink (the so-called vacuum packing) is performed for air infiltration prevention into the ink leakage and case in an intact state at the time of shipment (for example, refer to JP,7-132611,A). and the time of use by the user -- a packing bag to an ink cartridge -- taking out -- a closure member -- removing -- an air free passage -- while carrying out opening of the hole, a recording head is made to open an ink feed hopper for free passage

[0004]

[Problem(s) to be Solved by the Invention] by the way -- general -- an ink cartridge -- setting -- an ink feed hopper and an air free passage -- for example, the air free passage with better the hole being mutually separated -- it is thought that it is easy to use the ink within a case without futility that air is hard to be drawn in an ink feed hopper simplistically from a hole etc., and an ink feed hopper arranges in a case inferior surface of tongue -- having -- an air free passage -- the hole is arranged in the case upper surface on the other hand -- the time of the ink restoration by the manufacturing process -- an ink feed hopper -- as an ink restoration mouth -- making it serve a double purpose -- an air free passage -- a hole is used as a reduced pressure mouth for decompressing the inside of a case, and it is made to fill up ink with decompressing the inside of a case from an ink feed hopper In this case, restoration equipment and the decompression device in a manufacturing process need to approach from both sides to a case for ink restoration. Moreover, the seal tape for closing an air run through-hole as an ink feed hopper after ink restoration It is necessary to take about from the upper surface of a case to an inferior surface of tongue (for example, refer to JP,9-70982,A). Rotating a case, since it could not work from Mukai on the other hand to the case when about [that a long tape is needed] and a seal tape was stuck using a roller mechanism, the seal tape had to be taken about from the upper surface of a case to the inferior surface of tongue, and workability was bad.

[0005] Moreover, in order to be hard to weld, to cause poor welding, since a seal tape is welded in a manufacturing process near the ink [an ink restoration mouth-cum-] feed hopper which has got wet in ink, and to avoid this poor welding, when heat is kicked in many in the case of heat welding, an ink feed hopper deforms and there is a problem of it becoming impossible to perform joint with a recording head good.

[0006] Furthermore, as mentioned above, when the inside of a case is decompressed, the whole case may deform and it may be unable to be efficiently filled up with ink in a case. Moreover, when it is the composition that the porosity material which makes ink absorb is held in the case, to fill up with ink efficiently to all the corners in porosity material

is demanded. On the other hand, in case a user uses it, a seal tape can be removed easily and it is requested that the ink within a case can be used efficiently.

[0007] Moreover, the ink residue is detected always or periodically, and when it is detected that the ink residue decreased, it is made to demand exchange of an ink cartridge from a user in this kind of ink cartridge. Although ink residue detection in this ink cartridge is performed by generally detecting ink oil-level height, since the ink cartridge is carried in the carriage by which scanning movement is carried out and it is [an oil level shakes and] easy to change, it is easy to cause incorrect detection.

[0008] Then, for the reason, case structure was complicated although preparing a rib-like member in a cartridge case was known for the former in order to lessen this oil-level change (shake). Moreover, although known [for which an ink residue is detected] about the porosity material for being filled up with the ink within a case by the way, it was difficult for the existence of ink to detect an ink residue correctly in a form portion for a barrack reason.

[0009] Furthermore, with the image formation equipment of an ink-jet formula, in order to recover the injection function of ink, attracting a lot of ink from a recording head is performed. When the ink oil level in an ink cartridge descends rapidly, not all the ink in contact with the wall surface of an ink cartridge moves to the almost same height position as an ink oil level immediately, and time maintenance of the grade which is in the state in which little ink adhered to the wall surface is carried out by this suction. This phenomenon is in the inclination which appears notably, so that it is so close to the center section of the flat wall surface that it separates from the corner portion of the outer wall of an ink cartridge. Therefore, although the ink oil level fell and the ink residue has decreased in fact when detecting-element grade is set up near the center section of the wall surface, it cannot be detected but there is also a problem of generating incorrect detection.

[0010] On the other hand, when a sensor, especially a reflected light type sensor detect the ink residue in an ink cartridge, in order to carry out outgoing radiation of the light to detecting-element grade correctly from a light emitting device and for a photo detector to receive certainly the reflected light in the inside of the outer wall of the ink cartridge which is detecting-element grade, you have to set up correctly the position of the light emitting device to detecting-element grade, and a photo detector. However, in a manufacture stage, variation may generate an ink cartridge in the attachment state of a reflected light sensor over carriage while the wearing states of an ink cartridge when a user exchanges may differ delicately since it can equip free [attachment and detachment] to a recording head, so that a user can exchange. Thus, when an attaching position, an angle, etc. of the distance between a reflected light sensor and detecting-element grade and the reflected light sensor to detecting-element grade are delicately out of order, a photo detector cannot receive the reflected light appropriately, but the problem that cannot detect the ink residue in an ink cartridge, or the detection precision of an ink residue falls remarkably also has it.

[0011] moreover, the internal surface of an ink room which holds ink in this kind of ink cartridge -- a ***** air free passage -- a hole -- ink may invade into a side becoming unsightly, when a case is transparent or translucent, even if ink does not leak out outside or does not leak out **** -- an air free passage -- a hole will be closed and trouble will be caused to the ink supply to a recording head

[0012] Furthermore, in an ink cartridge, the 2nd locus are prepared in the lower stream of a river of the 1st locus which hold in a case the porosity material which absorbed ink, and these 1st locus, and some which supply ink are in a recording head through an ink feed hopper from the 2nd locus. In such composition, when a foam invades into the 2nd locus from the 1st locus and the foam is drawn in a recording head from the 2nd locus, a recording head has with a foam a possibility that ink jet may become impossible.

[0013] Moreover, in the above vacuum packings, in order to maintain the interior at a reduced pressure state at a long period of time, space is required between an ink cartridge and the packing bag for a pack, and, as for this space, the degree of vacuum is made higher than the interior of an ink cartridge. If an abbreviation rectangle-like ink cartridge is contained into a packing bag and a packing bag sticks to a cartridge, it becomes difficult for the open air which invaded gradually through the packing bag to fill comparatively few crevices between a packing bag and an ink cartridge at an early stage, and to maintain a reduced pressure state over a long period of time.

[0014] then, the thing in which the space which makes the appearance of a cartridge the configuration which made the part project instead of a simple rectangle, and a packing bag does not stick beside a lobe in order to carry out the specified quantity reservation of the reduced pressure space was formed -- it is (for example, refer to JP,10-250111,A) -- in such a configuration, the hole might open into the packing bag by the square of a cartridge etc. Moreover, inserting another parts (spacer) which are easy to penetrate air like corrugated paper or an urethane foam inside a packing bag, and have space inside is also known (for example, refer to above-shown JP,7-132611,A).

[0015] However, it is not desirable, when inserting another parts in the interior of a packing bag as mentioned above, and the part process increases on manufacture, and it becomes cost quantity, and the appearance of a packing bag becomes large and it miniaturizes.

[0016] this invention does easy the seal attachment work to each opening of a case which is made in order to solve the trouble mentioned above, makes it easy to approach to a case and performs the restoration equipment and the decompression device for ink restoration after ink restoration.

[0017] Moreover, while enabling it to fill up even all the corners within a case with ink efficiently, it prevents that a case deforms and enables it to be filled up much more efficiently with the reduced pressure at the time of restoration.

[0018] Moreover, as residue detection of ink can be carried out using the space for being filled up with ink in a case, change of an ink oil level is suppressed despite easy case structure, and exact residue detection is enabled.

Furthermore, when an oil level is rapidly changed by suction of the ink from a recording head etc. as mentioned above, or even when variation is in the installation state of a sensor, exact residue detection is enabled.

[0019] moreover, the air free passage from an ink room -- a hole -- even if it may prevent the invasion of the ink to a side and may invade only -- leaking out outside **** -- an air free passage -- it is made not to blockade a hole

[0020] Moreover, when ink is supplied to the 2nd locus one by one from the 1st locus at an ink room, even if air bubbles may invade into the 2nd locus, it prevents that air bubbles are directly drawn in a recording head, and poor jet of the ink by air bubbles is lost.

[0021] Moreover, the reduced pressure state in the packing bag which carried out sealing enclosure of the ink cartridge is maintained over a long period of time, and especially another parts are not needed for moreover forming the space for it, but it aims at offering the ink cartridge from which curtailment of a manufacturing cost is aimed at, and a miniaturization also becomes easy.

[0022]

[A The means for solving a technical problem and an effect of the invention] In order to attain the above-mentioned purpose invention of a claim 1 In the ink cartridge which holds the ink supplied to a recording head The 1st locus which hold the porosity material in which partition formation was carried out by the bridge wall into the case which opened at least one field wide, and the aforementioned case, and which absorbed ink under opening to the open field side of a case, respectively, and the 2nd locus which hold ink, The ink restoration mouth for forming the open field of the 1st locus of the above, and the 2nd locus in the open field of wrap covering device material, or the 1st locus of the above or the 2nd locus, and filling up the 1st locus of the above, and the 2nd locus with ink, The 1st locus of the above or the 2nd locus either And in order to be formed in the open field of another side and to decompress the 1st locus of the above, and the 2nd locus, It is in the ink cartridge characterized by having a reduced pressure mouth connectable with the source of reduced pressure, and the run through-hole which opens the 1st locus of the above, and the 2nd locus for free passage mutually by the opposite side the open aforementioned field side.

[0023] When filled up with ink, since what is necessary is just to carry out a seal from one side to a case after that, workability is [that what is necessary is just to bring restoration equipment and a decompression device close from one side to a case in a manufacture stage] good according to this composition, since an ink restoration mouth and a reduced pressure mouth are in one field of a case. Furthermore, since ink passes along the 2nd locus and 1st locus one by one towards a reduced pressure mouth from an ink restoration mouth at the time of ink restoration, both locus can be efficiently filled up with ink. In addition, this composition did not need to open vertical ends like the case mentioned later, and has just opened the whole surface of a case wide at least. moreover, it mentions later -- as -- ink -- the 1st locus to the 2nd locus -- ** -- not only supplying a recording head later on but the 2nd locus to the 1st locus -- ** -- it can also constitute so that a recording head may be supplied later on

[0024] It has the ink feed hopper by which invention of a claim 2 supplies the ink of the 1st locus of the above, or the 2nd locus to the field where the aforementioned case differs from the aforementioned open field in an ink cartridge according to claim 1 at a recording head. According to this composition, since the ink feed hopper is prepared apart from the ink restoration mouth or the reduced pressure mouth, an ink feed hopper can be blockaded in a sealant before ink restoration, after ink restoration and ink adhere to an ink feed hopper like before, and pasting of the sealant to an ink feed hopper is not checked. Ink seems therefore, not to begin to leak, in case the seal of the ink feed hopper is carried out certainly, an ink cartridge can be shipped and a user equips a recording head with a cartridge.

[0025] As for invention of a claim 3, in an ink cartridge according to claim 2, the aforementioned open field and an opposite side are also opened wide, as for the aforementioned case, the aforementioned ink restoration mouth and a reduced pressure mouth are formed in the aforementioned covering device material, respectively, and the aforementioned ink feed hopper is formed in the covering device material of a wrap 2nd in the open field of an opposite side. A case is easy to form the 1st locus and the 2nd locus, since the ends side is opened wide, and although it is necessary to wash a case so that the physical properties of ink may not change, if the ends side is opened wide, washing and dryness are still easier according to this composition. Moreover, porosity material is inserted in the 1st locus, it is a wrap in covering device material, and assembly is easy. The work which sticks the sealant which

carries out the seal of an ink restoration mouth and the reduced pressure mouth to one field, and the sealant which carries out the seal of the ink feed hopper to the field of another side in process in which an ink cartridge is conveyed in a manufacture stage further again can carry out easily with a roller etc.

[0026] the air free passage for which invention of a claim 4 opens the covering device material of the above 2nd for free passage to the 1st locus of the above in an ink cartridge according to claim 3 -- it has a hole according to this composition -- an ink feed hopper -- standing in a line -- an air free passage -- carrying out the seal of the ink feed hopper by the sealant in the process conveyed in a manufacture stage, since a hole is located, simultaneously an air free passage -- the seal also of the hole can be carried out

[0027] In order that invention of a claim 5 may decompress the inside of the ink restoration mouth for filling up the 1st field of the case having ink with ink in this case in the ink cartridge which holds the ink supplied to a recording head, and this case, Form a reduced pressure mouth connectable with the source of reduced pressure, and the ink feed hopper which supplies ink to a recording head is formed in the 2nd field of it and an opposite side. It is in the ink cartridge characterized by having blockaded in the 1st sealant which stuck the aforementioned ink restoration mouth and the reduced pressure mouth on the 1st field of the above, and blockading in the 2nd sealant which stuck the aforementioned ink feed hopper on the 2nd field of the above possible [ablation].

[0028] According to this composition, in process in which an ink cartridge is conveyed in a manufacture stage, the work which sticks the 1st sealant which carries out the seal of an ink restoration mouth and the reduced pressure mouth to one field, and the 2nd sealant which carries out the seal of the ink feed hopper to the field of another side can be easily done using a roller etc. Since an ink feed hopper is not used on the occasion of restoration of ink, like before, an ink feed hopper gets wet in ink, and does not worsen seal nature. Moreover, in case a recording head is equipped with a cartridge in a user side, it exfoliates easily and wearing can be presented only with one 2nd sealant.

[0029] the air free passage for which, as for invention of a claim 6, the 2nd field of the above opens the inside and outside of the aforementioned case for free passage further in an ink cartridge according to claim 5 -- a hole -- having - the 2nd sealant of the above -- the aforementioned air free passage -- a hole is also blockaded possible [ablation] if only the 2nd sealant of one field is exfoliated in case a recording head is equipped with a cartridge in a user side according to this composition -- an ink feed hopper -- an air free passage -- since opening also of the hole can be carried out, it uses and wins and ** is good

[0030] In the ink cartridge which holds the ink which supplies invention of a claim 7 to a recording head Partition formation is carried out by the bridge wall into the case which opened at least one field wide, and the aforementioned case. The atmosphere besides the aforementioned case, and the air free passage way which opens an end for free passage to an opposite close-attendants side in the aforementioned ink interior of a room, and opens the other end for free passage with an open field side while opening to the open ink room [in which it opens wide to the open field side of the aforementioned case, and ink is held], and field side of a case, It is in the ink cartridge characterized by having an ink feed hopper for opening the open field of the aforementioned ink room for free passage at least in the aforementioned ink room formed in wrap covering device material and the aforementioned covering device material, and supplying ink to a recording head.

[0031] Since according to this composition ink is supplied to a recording head through an ink feed hopper from an ink room and the atmosphere is introduced into an ink room from a side far from an ink feed hopper through an air free passage way, the ink of an ink room can be used efficiently. Moreover, since an ink room is made to open an ink feed hopper for free passage while closing an ink room by forming in the state where the ink room and the air free passage way were wide opened to one field of a case, and equipping the open field of a case with covering device material, the composition of this portion is easy and can be attached easily. Furthermore, since an ink feed hopper and the opening edge of an air free passage way are located in a line in one field, at the time of shipment, use can be presented only by being able to cover an ink feed hopper and an air free passage way easily by one sealant, as a result removing this one seal, it uses and wins, and ** is good. In addition, although constituting from the 1st locus and 2nd locus is desirable as for this composition so that an ink room may be mentioned later, even if constituted only from one locus, it does not interfere.

[0032] the air free passage which the aforementioned covering device material is a wrap thing in an ink cartridge according to claim 7 about the open field of the aforementioned ink room and the aforementioned air free passage way, and invention of a claim 8 opens for free passage with the air free passage way -- it has a hole according to this composition -- covering device material -- the open field of a case -- a wrap -- an ink feed hopper and an air free passage -- a hole can be arranged together with the inside of one field, and the above-mentioned operation effect is acquired

[0033] In the ink cartridge which holds the ink which supplies invention of a claim 9 to a recording head The air free passage way which opens the ink room in which partition formation is carried out by the bridge wall into the case

which opened two fields which counter wide, and the aforementioned case, it opens wide to both the opening side side of a case, respectively, and ink is held, and this ink room for free passage with the atmosphere besides the aforementioned case, The 1st covering device material with which leaves the path which opens the aforementioned ink room and an air free passage way for free passage, is wearing one field of the aforementioned case, and it is equipped, In the field of another side of the aforementioned case, it is in the ink cartridge characterized by having the ink feed hopper for it being open for free passage at the aforementioned ink room, and supplying ink at a recording head formed in the 2nd covering device material with which covers the aforementioned ink room and it is equipped, and the covering device material of the above 2nd at least.

[0034] Since two fields where a case counters are opened wide according to this composition, although it is necessary to wash a case so that the physical properties of ink may not change, if two fields which counter are opened wide, washing and dryness are easy [formation of an ink room and an air free passage way is easy, and]. And by covering both open ends by the 1st and 2nd covering device material, while assembly is easy, the operation effect equivalent to invention of the above-mentioned claim 7 is acquired.

[0035] In the ink cartridge according to claim 9, the aforementioned ink room had the 1st locus which held the porosity material which was further divided by the bridge wall, and which absorbed ink, and the 2nd locus which have not held this porosity material, and covered the 1st locus of the above, or the 2nd locus by the covering device material of the above 1st, and invention of a claim 10 has covered another side by the 2nd covering device material. According to this composition, porosity material can be held in the 1st locus, and composition of the case for forming two locus for the 1st locus and the 2nd locus by the wrap's by covering device material, respectively can be simplified, and it can attach easily.

[0036] While invention of a claim 11 opens the 1st locus of the above for free passage with the aforementioned air free passage way in an ink cartridge according to claim 10, it is open for free passage with the 2nd locus of the above by this air free passage way and opposite side, and the 2nd locus of the above are open for free passage with the aforementioned ink feed hopper. According to this composition, during record operation, it has by the proper pressure from an ink feed hopper through the 2nd locus with the absorptive power of the porosity material of the 1st locus, and a recording head is supplied. If the ink of the 2nd locus flows out of an ink feed hopper, while ink will be supplied to the 2nd locus from the porosity material of the 1st locus, the atmosphere is introduced into the 1st locus from an air free passage way. Consequently, after the ink of the 1st locus is consumed, the ink of the 2nd locus is consumed and the whole ink is used effectively.

[0037] In the ink cartridge which holds the ink which supplies invention of a claim 12 to a recording head In the case which constitutes this cartridge, by the unilateral wall and the bridge wall formed mostly at parallel The 1st locus which hold ink, and the 2nd locus for being mostly arranged with the aforementioned side attachment wall at parallel, and filling up these 1st locus with ink, While forming the air free passage way for being mostly arranged with the aforementioned side attachment wall at parallel, and opening these 1st locus for free passage with the atmosphere besides the aforementioned case and opening the end of the 2nd locus of the above for free passage in the end section of the 1st locus of the above While opening the other end wide out of the aforementioned case through an ink restoration mouth and opening the end of the aforementioned air free passage way for free passage at the free passage section with the 2nd locus of the 1st locus of the above, and the edge of an opposite side, it is in the ink cartridge characterized by opening the other end wide to the atmosphere besides the aforementioned case.

[0038] According to this composition, the whole is efficiently filled up with the ink introduced through the 2nd locus at the time of ink restoration into a case when the 1st and 2nd locus were decompressed from the end of the 1st locus. And since an air free passage way and the 2nd locus are mostly formed in parallel with the unilateral wall of a case, a side attachment wall serves as about 2-fold structure, and the intensity of a case increases. For this reason, deformation of the case at the time of decompressing the inside of a case at the time of ink restoration decreases, and the 1st locus can be efficiently filled up with ink.

[0039] In an ink cartridge according to claim 12, the aforementioned air free passage way and the 2nd locus are located along with the side attachment wall of the opposite side of the aforementioned case by invention of a claim 13, respectively. According to this composition, the both-sides wall of a case can be reinforced, deformation of the whole case can be lessened further, and the operation effect of invention of the claim 12 above-mentioned publication is acquired notably.

[0040] Invention has an ink feed hopper for the 2nd locus of the above supplying ink to a recording head near the free passage section with the 1st locus of the above in a claim 14 in an ink cartridge according to claim 12, and the indoor ink of the above 1st is supplied to it from the aforementioned ink feed hopper through the 2nd locus of the above at a recording head. According to this composition, the 2nd locus filled up with ink can also function as an ink room substantially, and can hold a lot of ink as a cartridge. Moreover, if a foam flows into the 2nd locus from the 1st

loculus, it can lessen that the foam can surface above the 2nd loculus, and can lessen flowing into an ink feed hopper, therefore record beef fat lapses into un-spouting with a foam.

[0041] Invention of a claim 15 is set to an ink cartridge according to claim 14. the 1st loculus of the above While being wide opened in the aforementioned side attachment wall and the right-angled end side, it is covered by the 1st covering device material, and while the 2nd loculus of the above are wide opened in the other end side of the aforementioned end and an opposite side, it is covered by the 2nd covering device material and the aforementioned ink feed hopper is formed in the covering device material of the above 2nd. According to this composition, since the 2nd loculus are opened [in / the other end / on the end of a case, and] wide, respectively, by being able to perform case fabrication easily and equipping with the 2nd covering device material, an ink feed hopper is open for free passage with an ink restoration way, it has and the 1st loculus can realize easily a cartridge with the function of invention according to claim 14.

[0042] In the ink cartridge which holds the ink which supplies invention of a claim 16 to a recording head The case where open vertical ends wide and it has two side attachment walls which counter, and the 1st and 2nd bridge walls mostly prolonged in parallel with the aforementioned both-sides wall in the aforementioned case, Connect with the soffit of both the bridge wall, and partition formation is carried out by the soffit opening side of the aforementioned case, and the 3rd bridge wall mostly prolonged in parallel. this -- with the 1st loculus located between the upper-limit opening sides of the 1st and 2nd bridge walls, the 3rd bridge wall, and the aforementioned case, the 2nd loculus located between one side attachment wall and the 1st bridge wall, and the air free passage way located between the side attachment wall of another side, and the 2nd bridge wall The 1st covering device material which was wearing the upper-limit opening side of the above 1st, and fixed in the aforementioned case, It has the 2nd covering device material which has the ink feed hopper which is wearing the soffit opening side of the aforementioned case, is open for free passage with the soffit of the 2nd loculus of the above, and supplies ink to a recording head. Open for free passage through a hole the free passage which formed the 1st loculus of the above, and the 2nd loculus of the above in the 3rd bridge wall of the above -- the 1st loculus of the above, and the aforementioned air free passage way -- the aforementioned free passage -- the 1st loculus far from a hole of the above -- almost -- a upper limit -- open for free passage -- the aforementioned air free passage way -- the atmosphere from the soffit of the aforementioned case -- opening -- it is in the ink cartridge characterized by things the bottom

[0043] According to this composition, ink is supplied to a recording head through an ink feed hopper from the 2nd loculus, and ink is supplied to the 2nd loculus from the 1st loculus. The atmosphere is introduced into the 1st loculus from a side far from a run through-hole through an air free passage way from the soffit of a case. Therefore, after the ink of the 1st loculus is consumed, the ink of the 2nd loculus is consumed and the whole ink is used effectively. And as mentioned above, in a manufacture stage, washing and dryness of a case are easy and do not affect the physical properties of the ink after restoration for ink because the ends of a case have opened wide. Moreover, since an ink feed hopper and the opening edge of an air free passage way are located in a line with the inferior surface of tongue of a case, both can be easily covered by one sealant and use can be easily presented only by removing one sealant also in a user.

[0044] the air free passage which invention of a claim 17 opens the covering device material of the above 1st for free passage to the 2nd loculus of the above, and has an ink restoration mouth for filling up the above 1st and the 2nd loculus with ink in an ink cartridge according to claim 16, and the covering device material of the above 2nd opens for free passage on the aforementioned air free passage way -- it has a hole According to this composition, the 1st loculus can be filled up with ink through the 2nd loculus using the 2nd loculus from an ink restoration mouth. Since an ink feed hopper is not used on the occasion of restoration of ink, like before, an ink feed hopper gets wet in ink, and does not worsen seal nature.

[0045] In the ink cartridge which holds the ink which supplies invention of a claim 18 to a recording head The 1st and 2nd loculus in which partition formation is carried out by the bridge wall and which hold ink in the case which constitutes this cartridge, the free passage which opens the above 1st and the 2nd loculus for free passage mutually in the lower part -- it forms in a hole and the upper limit of the 2nd loculus of the above -- having -- the aforementioned free passage from the 2nd ink room -- pass a hole -- with the ink restoration mouth for filling up the 1st loculus of the above with ink The seal member which blockades the aforementioned ink restoration mouth, and the ink feed hopper which is formed in the soffit of the 2nd loculus of the above, and supplies ink to a recording head, the air free passage which opens the 1st loculus of the above for free passage to the atmosphere -- it has a hole and is in the ink cartridge characterized by making a part of side attachment wall of the 2nd loculus transparently or translucent at least

[0046] According to this composition, when ink is supplied to a recording head from an ink feed hopper, ink is supplied to the 2nd loculus from the 1st loculus, and it decreases from the ink of the 1st loculus first. The ink of the 2nd loculus decreases in number air flowing into the 2nd loculus from the same room, if the ink supplied from the 1st

loculus is lost. That is, since the oil level of the 2nd loculus descends, the residue of ink can be known by detecting this by viewing or the sensor. Moreover, since the 1st loculus are filled up with ink through the 2nd loculus and a run through-hole from an ink restoration mouth and the restoration mouth is blockaded by the seal member, the 2nd loculus can be certainly filled up with the ink of the specified quantity at the beginning, and there is no incorrect detection of an ink residue.

[0047] In an ink cartridge according to claim 18, the 1st loculus of the above have larger capacity than the 2nd loculus of the above, and invention of a claim 19 is equipped with the porosity material which absorbed ink. According to this composition, from an ink feed hopper, it can have by the proper pressure and the ink of a constant rate can be supplied to a recording head with the absorptive power of porosity material also in the state where the 1st loculus are filled with a lot of ink. Moreover, since an ink residue is detected in the 2nd loculus of small capacity, while there is little ink which can make small the ink residue when judging that there is no ink residue as much as possible, and becomes useless, there is little incorrect detection of ink depended for being choppy.

[0048] In the ink cartridge according to claim 19, the upper limit of the 1st loculus of the above and the 2nd loculus is covered by one covering device material, and, as for invention of a claim 20, the aforementioned ink restoration mouth is formed in the covering device material. Since it equips with the seal member which holds the porosity material inserted in the 1st loculus by covering device material, and blockades an ink restoration mouth in the covering device material according to this composition, composition of these portions can be simplified. Especially, it can stick on covering device material easily as a seal member using a sheet-like thing.

[0049] Invention of a claim 21 has the concave protruding line to which the inside of the transparent or translucent portion of the side attachment wall of the 2nd loculus of the above extends in the vertical direction in the ink cartridge according to claim 18. When using what consists of a light-emitting part and a light sensing portion as a residue detection sensor according to this composition, In case the light by which outgoing radiation was carried out from the light-emitting part reflects by the inside of the side attachment wall of the 2nd loculus Since it progresses to the light sensing portion side, spreading within the flat surface in which it is scattered about in the direction which intersects perpendicularly with a concave protruding line, and the reflected light contains a light-emitting part and a light sensing portion, and the detecting-element grade of a case main part by the concave protruding line of the inside Even when the interval of detecting-element grade and a sensor changes delicately, a light sensing portion can receive the reflected light certainly, because the wearing position of an ink cartridge and the attaching position of a sensor shift slightly. Therefore, though a certain amount of variation occurs in the attachment state of a sensor, or the wearing state of an ink cartridge, the ink residue in an ink cartridge is certainly detectable.

[0050] In the ink residue detection mechanism in which a sensor detects the ink in the ink cartridge which held the ink which supplies invention of a claim 22 to a recording head the aforementioned ink cartridge The case which has the 1st and 2nd loculus in which partition formation is carried out by the bridge wall, and which hold ink inside, and made a part of side attachment wall of the 2nd loculus transparently or translucent at least, the free passage which opens the above 1st and the 2nd loculus for free passage mutually in the lower part -- it forms in a hole and the upper limit of the 2nd loculus of the above -- having -- the aforementioned free passage from the 2nd ink room -- pass a hole -- with the ink restoration mouth for filling up the 1st loculus of the above with ink The seal member which blockades the aforementioned ink restoration mouth, and the ink feed hopper which is formed in the soffit of the 2nd loculus of the above, and supplies ink to a recording head, the air free passage which opens the 1st loculus of the above for free passage to the atmosphere -- it has a hole and the aforementioned sensor is in the ink residue detection mechanism characterized by carrying out opposite arrangement with the transparent or translucent portion of the side attachment wall of the 2nd loculus

[0051] According to this composition, in the 2nd loculus after consuming the ink of the 1st loculus, reduction of an ink residue can be known by detecting reduction of the ink of the 2nd loculus used for restoration of ink by the sensor like invention of a claim 18. Since the beginning is certainly filled up with the ink of the specified quantity, there is no incorrect detection of an ink residue in the 2nd loculus.

[0052] Invention of a claim 23 carried out opposite arrangement of the aforementioned sensor in the ink residue detection mechanism according to claim 22 with the ridgeline portion prolonged in the vertical direction formed when the 2nd [at least] page which makes the inside of the 2nd loculus of the above crosses. Since the ink in which capillarity adhered to the inside of the 2nd loculus by **** Lycium chinense even if there was a rapid change of an ink oil level moves to a ridgeline portion to near the ink oil level immediately, the ink residue of the 2nd loculus is correctly detectable.

[0053] In the ink residue detection mechanism according to claim 22, the aforementioned sensor has a light-emitting part and a light sensing portion, and invention of a claim 24 has the concave protruding line prolonged in the direction which intersects perpendicularly with the flat surface in which the inside of the transparent or translucent portion of the

side attachment wall of the 2nd locus of the above contains the light-emitting part of the aforementioned sensor and a light sensing portion, and the detecting-element grade of the 2nd locus by the aforementioned sensor. Since according to this composition it progresses to the light sensing portion side while the light by which outgoing radiation was carried out from the light-emitting part is scattered about in the direction which intersects perpendicularly with a concave protruding line like invention of a claim 21 and the reflected light spreads, even if the wearing position of an ink cartridge and the attaching position of a sensor shift slightly, a light sensing portion can receive the reflected light certainly.

[0054] In an ink residue detection mechanism equipped with the ink cartridge which has the ink room in which the ink which supplies invention of a claim 25 to a recording head was held inside, and the sensor which detects the ink of this ink interior of a room On the side prolonged in the vertical direction of the case which constitutes the aforementioned ink cartridge, while carrying out opposite arrangement, the aforementioned sensor It is in the ink residue detection mechanism characterized by setting the detecting-element grade by the aforementioned sensor as the ridgeline portion prolonged in the vertical direction formed when the 2nd [at least] page which makes the inside of the aforementioned ink room crosses.

[0055] Into the ridgeline portion prolonged in the vertical direction formed when the 2nd [at least] page which makes the inside of an ink room crosses according to this composition Since the ink which adhered to the inside of an ink room when capillarity worked moves to near the ink oil level immediately with the fall of an ink oil level, existence of the ink in detecting-element grade cannot be incorrect-detected, and the ink residue of the ink interior of a room can be detected with a sufficient precision. In addition, although it is desirable to constitute a sensor from a light-emitting part and a light sensing portion as mentioned above as for this composition, it can also use sensors of other kinds, such as an electrode.

[0056] In the ink residue detection mechanism according to claim 25, the aforementioned case counters nothing and its one ridgeline in a rectangle mostly in a flat surface, and, as for invention of a claim 26, the aforementioned sensor is formed. According to this composition, the detection precision of an ink residue can be raised easily, without the 2nd [at least] page's not forming separately the ridgeline portion prolonged in the vertical direction crossed and formed, and making the ink cartridge itself complicated structure at the ink cartridge itself.

[0057] Invention of a claim 27 constitutes the side attachment wall of the aforementioned case in the aforementioned detecting-element grade by transparence or translucent material in an ink residue detection mechanism according to claim 25, and the aforementioned sensor consists of the light-emitting part and light sensing portion which countered the ridgeline portion and were prepared. Since it is not necessary to form sensors, such as an electrode, in the ink cartridge itself which must be exchanged periodically and an ink residue can be detected with a sufficient precision from the exterior of an ink cartridge according to this composition, the structure of the ink cartridge itself becomes easy and the manufacturing cost of an ink cartridge can be reduced.

[0058] The aforementioned case holds the porosity material to which invention of a claim 28 absorbed ink in the ink residue detection mechanism according to claim 25, and it has the atmosphere, the 1st locus in a free passage state, and the 2nd ink room that was open for free passage to the 1st locus, held only ink, and sealed the upper part, and the aforementioned sensor is formed so that the ink residue of the 2nd locus of the above may be detected. According to this composition, after consuming the ink of the 1st locus as mentioned above, the ink residue at the time of exchanging ink cartridges can be made small as much as possible by detecting reduction of the 2nd indoor ink.

[0059] In the ink cartridge by which the ink of the aforementioned ink interior of a room is detected by the reflected light sensor which invention of a claim 29 has the ink room in which the ink supplied to a recording head was held inside, and has a light-emitting part and a light sensing portion The inside of the side attachment wall of the aforementioned ink room which is the detecting-element grade by the aforementioned reflected light sensor is in the ink cartridge characterized by having the concave protruding line prolonged in the direction which intersects perpendicularly with the flat surface containing the light-emitting part and the light sensing portion, and the aforementioned detecting-element grade of the aforementioned reflected light sensor.

[0060] Since it has the concave protruding line prolonged in the direction in which the flat surface containing the light-emitting part of the aforementioned reflected light sensor and a light sensing portion, and the detecting-element grade of the aforementioned ink room and the inside of the ink room which is the detecting-element grade by the reflected light sensor cross at right angles according to this composition, In case the light by which outgoing radiation was carried out from the light-emitting part reflects by the inside of an ink room side attachment wall, it is scattered about in the direction which intersects perpendicularly with a concave protruding line by the concave protruding line of the inside. Since it progresses to the light sensing portion side while the reflected light spreads within the flat surface containing a light-emitting part and a light sensing portion, and detecting-element grade Even when the interval of detecting-element grade and a reflected light sensor changes delicately, a light sensing portion can receive the reflected

light certainly, because the wearing position of an ink cartridge and the attaching position of a reflected light sensor shift slightly. Therefore, though a certain amount of variation occurs in the attachment state of a reflected light sensor, or the wearing state of an ink cartridge, the ink residue of the ink interior of a room is certainly detectable.

[0061] Invention of a claim 30 has the concave protruding line prolonged in the flat surface in which the superficies of the side attachment wall of the aforementioned ink room which is the detecting-element grade by the aforementioned reflected light sensor contain the light-emitting part of the aforementioned reflected light sensor and a light sensing portion, and the detecting-element grade by the aforementioned reflected light sensor, and parallel in the ink cartridge according to claim 29. Since according to this composition it progresses to the light sensing portion side while the light reflected by the appearance of the outer wall of a case main part spreads on the plane outside where it is scattered about in the direction which intersects perpendicularly with a concave protruding line, and the reflected light contains the light-emitting part of a reflected light sensor and a light sensing portion, and the detecting-element grade of the aforementioned case main part by the concave protruding line of the superficies, a light sensing portion stops easily being able to receive the reflected light in the outer wall superficies which do not contribute to detection of an ink residue. Therefore, the ratio of the reflected light component from the outer wall inside which contributes to detection of an ink residue among the reflected lights which a light sensing portion receives becomes high, and the detection precision of an ink residue improves.

[0062] Invention of a claim 31 the existence of the ink of the ink interior of a room which holds ink It is the ink cartridge by which an ink residue is detected by detecting by the reflected light sensor which has the light-emitting part and light sensing portion which were installed in the outside of this ink room. The field corresponding to the inside of the side attachment wall of the aforementioned ink room which is the detecting-element grade by the aforementioned reflected light sensor is fabricated using the metal mold polished in the direction which intersects perpendicularly with the flat surface containing the light-emitting part of the aforementioned reflected light sensor and a light sensing portion, and the detecting-element grade of the aforementioned case main part. According to this composition, the ink cartridge of invention according to claim 29 can be fabricated easily.

[0063] Invention of a claim 32 is formed in the ink cartridge according to claim 31 using the flat surface in which the field corresponding to the superficies of the side attachment wall of the aforementioned ink room which is the detecting-element grade by the aforementioned reflected light sensor contains the light-emitting part of the aforementioned reflected light sensor and a light sensing portion, and the detecting-element grade by the aforementioned reflected light sensor, and the metal mold polished by parallel. According to this composition, the ink cartridge of invention according to claim 30 can be fabricated easily.

[0064] While invention of a claim 33 forms the 1st locus by which the porosity material which absorbed ink is contained in the case which constitutes this cartridge in the ink cartridge which holds the ink supplied to a recording head the air free passage which carries out opening of the 1st locus of the above to the atmosphere besides the aforementioned case through a path -- a hole -- open for free passage -- the edge of the internal surface of the 1st locus of the above -- the aforementioned path and an air free passage -- it is in the ink cartridge characterized by having been placed between the hole and connecting ***** with it

[0065] Since according to this composition the edge of the internal surface of the 1st locus is intervened and connected with the path and the air run through-hole in ***** and is not connected only with an edge, the 1st indoor ink can prevent infiltrating a bridge wall into a ***** air free passage way.

[0066] Invention of a claim 34 is set to an ink cartridge according to claim 33. The air free passage way which opens a hole for free passage is formed. the inside of the aforementioned case -- a bridge wall -- the 1st locus of the above, and the aforementioned path and the aforementioned air free passage -- Opening of the 1st locus and an air free passage way is covered by covering device material. and to the aforementioned covering device material While forming in the position distant from the aforementioned bridge wall the wall jutted out over the 1st locus side rather than the inside of the 1st locus of the above, with the aforementioned bridge wall, the field of the covering device material of an opposite side is equipped with the aforementioned path which opens the 1st locus of the above, and an air free passage way for free passage.

[0067] According to this composition, since the wall which covers opening of the 1st locus and an air free passage way by covering device material, and is jutted out over a 1st locus side at covering device material, and a bridge wall form a path in the field of an opposite side, they can establish the above-mentioned wall, without becoming in fabrication of a case in an undercut, and can manufacture it easily. And it can detach and form so that a path may not be made by the edge between bridge walls because there is such a wall, and the operation effect of invention of a claim 33 is acquired certainly.

[0068] In an ink cartridge according to claim 33, further, invention of a claim 35 covers the 1st locus of the above, and has the covering device material which equips the field of an opposite side with the aforementioned path with these

1st locus. to this covering device material The wall jutted out inside the 1st locus rather than the plane of composition of the aforementioned covering device material and the aforementioned case is formed in the position distant from the inside of the 1st locus of the above. And opening for opening the aforementioned path for free passage to the 1st locus of the above was formed in the position distant from the inside of the 1st locus of the above, and where the aforementioned porosity material is pressed with the aforementioned wall of the aforementioned covering device material, it has held in the 1st locus of the above. if porosity material is pressed by covering device material, although the ink in porosity material will ooze according to this composition -- the ink -- the edge of the 1st locus -- a ***** air free passage -- it can prevent leaking out to a hole

[0069] In the ink cartridge which holds the ink which supplies invention of a claim 36 to a recording head While forming the ink room which holds ink in the case which constitutes this cartridge, and the air free passage way which opens the ink room for free passage to the atmosphere besides the aforementioned case and preparing the through hole which opens the aforementioned ink room and the atmosphere for free passage in the aforementioned air free passage way It is in the ink cartridge characterized by preparing an ink reservoir in a position lower than the ink room side opening edge of the through hole. Since the ink which leaked from the ink room collects on an ink reservoir according to this composition, an air free passage way is not taken up or ink does not leak outside.

[0070] In an ink cartridge according to claim 36, the aforementioned through hole and an ink reservoir are formed in one wall for invention of a claim 37, and the upper limit of the aforementioned through hole and an ink reservoir have a level difference, and are formed. According to this composition, the ink which leaked from the ink room can take up an air free passage way, or can prevent leaking outside with easy composition.

[0071] In the ink cartridge which holds the ink which supplies invention of a claim 38 to a recording head In the case which constitutes this cartridge, by the unilateral wall and the bridge wall formed mostly at parallel The ink room in which ink is held, and the air free passage way which opens the ink room for free passage to the atmosphere besides the aforementioned case are formed. The through hole which opens the aforementioned ink room and the atmosphere for free passage in the wall which forms the vertical ends of the aforementioned air free passage way in an open state, leaves the path which opens the aforementioned ink room and an air free passage way for free passage for the upper limit of the aforementioned case, covers by covering device material, and divides the middle of the aforementioned air free passage way, It is in the ink cartridge characterized by forming a low ink reservoir rather than the upper limit of the through hole. Since according to this composition the vertical ends of an air free passage way were formed in the open state and the through hole and the ink reservoir were formed in the wall which divides the middle of an air free passage way In case a case is fabricated, it is possible to fabricate a through hole and an ink reservoir at the leaver section of an air free passage way and up-and-down corresponding metal mold, and the ink which leaked from the ink room can take up an air free passage way, or can prevent leaking outside with easy composition.

[0072] In the ink cartridge which holds the ink which supplies invention of a claim 39 to a recording head The ink room which holds ink in the case which constitutes this cartridge, The ink feed hopper which forms the air free passage way which opens the ink room for free passage to the atmosphere besides the aforementioned case, and supplies the ink of the aforementioned ink interior of a room to the inferior surface of tongue of the aforementioned case at a recording head, the air free passage which opens the aforementioned air free passage way to the atmosphere -- the covering device material in which the hole was formed -- equipping -- the upper surface of the aforementioned covering device material -- the aforementioned air free passage -- it is in the ink cartridge characterized by forming a low ink reservoir from the upper limit of a hole Since the air run through-hole adjoins on covering device material as the ink feed hopper, in case according to this composition both mouths can be easily blockaded by one sealant at the time of shipment and a recording head is equipped with an ink cartridge, a sealant can be exfoliated easily. and the covering device material -- an air free passage -- since the ink reservoir is formed in a low position rather than the upper limit of a hole, an air free passage way can be taken up, or the ink which leaked from the ink room can have leaking to the case exterior with easy composition, and can protect

[0073] In the ink cartridge which holds the ink which supplies invention of a claim 40 to a recording head The 1st locus which hold the porosity material which absorbed ink by the bridge wall in the case which constitutes this cartridge, The 2nd locus which are open for free passage through the run through-hole prepared in the lower part of the 1st locus, and hold ink are formed. the ink feed hopper which supplies ink to a recording head at the 2nd locus of the above -- preparing -- the aforementioned free passage -- it is in the ink cartridge characterized by establishing an obstruction on the shortest path which connects a hole and the aforementioned ink feed hopper

[0074] When a recording head draws ink from the 2nd locus with negative pressure with jet of the ink by the recording head according to this composition, It prevents with an obstruction that the foam which was going to go into the 2nd locus is drawn from the 1st locus. While ink bypasses an obstruction and flows, a foam can be surfaced, only ink can be mostly supplied to a recording head, consequently a recording head can reduce a bird clapper with a

foam un-spouting.

[0075] In an ink cartridge according to claim 40, invention of a claim 41 is formed in the state where the 2nd locus of the above were wide opened at the end of the aforementioned case, and forms the aforementioned obstruction in either of the aforementioned bridge walls which form the aforementioned ink feed hopper in wrap covering device material, and counter the open field at the aforementioned covering device material and it. According to this composition, since a case and covering device material constitute the 2nd locus, an obstruction can be fabricated easily and the passage at which it turned between the run through-hole and the ink feed hopper can be assembled easily.

[0076] Invention of a claim 42 consists of the 1st portion in which the 2nd locus of the above are located under the 1st locus of the above, and a portion which is the 2nd located between the side of the 1st locus, and the side attachment wall of the aforementioned case in an ink cartridge according to claim 41, opening of the aforementioned run through-hole is carried out to the 1st portion of the above, and the aforementioned obstruction is located in the 1st portion of the above. According to this composition, the air bubbles which went into the 2nd ink room from the 1st ink room bypass an obstruction, surface in the 2nd portion, and collect on the upper part of the 2nd portion. Therefore, it can lessen remarkable that air bubbles are drawn in a recording head.

[0077] The portion from which invention of a claim 43 constitutes the ceiling side of the 1st portion of the 2nd locus of the above in the bridge wall between the above 1st and the 2nd locus in an ink cartridge according to claim 42 inclines so that it may go up toward the 2nd portion. Since according to this composition it inclines so that the ceiling side of the 1st portion may go up toward the 2nd portion, a foam can be certainly led to the upper part of the 2nd portion, and it can lessen remarkable that a foam is drawn in a recording head.

[0078] In the ink cartridge which holds the ink supplied to a recording head, the ink room which held ink in the case which constitutes this cartridge, and this ink room have invention of a claim 44 in the ink cartridge characterized by forming the space which was not open for free passage and was open for free passage to the case exterior.

[0079] Since the space which was open for free passage to the case exterior in one was formed in the cartridge case according to this composition, when sealing enclosure of the cartridge is carried out at a packing bag and the inside of a packing bag is made into a reduced pressure state, the ink cartridge which can maintain a reduced pressure state at a long period of time can be offered. That is, although air will invade gradually from the outside if it sets for a long period of time even if it changes into a reduced pressure state, a reduced pressure state can be maintained by existence of the aforementioned space at a long period of time. And the space for maintaining this reduced pressure state can be secured, without needing another member like before, and curtailment of a manufacturing process and cost reduction become possible.

[0080] In the ink cartridge according to claim 44, it is equipped with covering device material so that the aforementioned ink room may wear the open end side of this case while partition formation is carried out by the bridge wall and the end of this case is formed of it in the aforementioned case at an open state, and the aforementioned space is formed of this covering device material and the aforementioned bridge wall, and, as for invention of a claim 45, puncturing to which it is open for free passage with the case exterior is prepared in this covering device material in this space. According to this composition, by equipping a case with covering device material, since forming the aforementioned space in one in a cartridge can carry out, it can manufacture easily with easy composition.

[0081] In an ink cartridge according to claim 44, sealing enclosure of the aforementioned case is carried out in the state of reduced pressure at a packing bag, and invention of a claim 46 serves as reduced pressure space for the aforementioned space maintaining the reduced pressure state in a packing bag. According to this composition, as explained in invention of a claim 47, maintenance of the reduced pressure state in a packing bag can carry out easily and certainly, and can maintain the deaeration state of ink over a long period of time.

[0082] Invention of a claim 47 is set to an ink cartridge according to claim 45. the aforementioned ink room It consists of the 1st locus which hold the porosity material which absorbed ink, and the 2nd locus which are open for free passage through a run through-hole to the 1st locus, are covered by the aforementioned covering device material, and hold ink. the aforementioned covering device material It has an ink feed hopper for supplying ink to the aforementioned recording head from the 2nd locus of the above, and the aforementioned space is adjoined and formed in the 2nd locus of the above.

[0083] According to this composition, the aforementioned space and the 2nd locus carry out opening to the open end side of a case, space will be in the state where it became independent of the 2nd locus, only by the wrap by covering device material about them, and the 2nd ink room will become a recording head through an ink feed hopper with what can supply ink. In this way, the aforementioned space can be easily formed in a cartridge.

[0084] Invention of a claim 48 is set to an ink cartridge according to claim 45. in the aforementioned case Of the aforementioned bridge wall, in an end, it is open for free passage in the aforementioned ink room and this ink room, and the atmosphere besides the aforementioned case and an air free passage way open for free passage are formed in

the other end, the aforementioned covering device material has a run through-hole for opening the aforementioned air free passage way for free passage to the atmosphere, and the aforementioned space is adjoined and formed in the aforementioned air free passage way.

[0085] According to this composition, the aforementioned space can be adjoined and formed in an air free passage way, the aforementioned space and an air free passage way can be made into the state where it became independent, by equipping a case with a lid, and the free passage of an ink room is attained through an air free passage way at the atmosphere. In this way, the aforementioned space can be easily formed in a cartridge.

[0086] Invention of a claim 49 is set to an ink cartridge according to claim 44. in the aforementioned case While it is open for free passage in an end in the aforementioned ink room and this ink room, the atmosphere besides the aforementioned case and an air free passage way open for free passage are formed in the other end of a bridge wall and the end of the aforementioned case is formed in an open state of it It is equipped with covering device material so that the open end side of this case may be worn. to this covering device material The ink feed hopper for supplying ink to the aforementioned recording head from the aforementioned ink room, A hole is formed. and the air free passage for opening the aforementioned air free passage way for free passage to the atmosphere -- Moreover, the aforementioned space is formed of the aforementioned covering device material and the aforementioned bridge wall, and it is blockaded by the seal member in which an air run through-hole can exfoliate, sealing enclosure of the aforementioned case is carried out in the state of reduced pressure at a packing bag, and it becomes the aforementioned ink feed hopper with the reduced pressure space for the aforementioned space maintaining the reduced pressure state in a packing bag.

[0087] According to this composition, by equipping a case with covering device material, the aforementioned space can be formed and an air run through-hole can be opened for free passage on an ink room and an air free passage way as an ink feed hopper, respectively. And an air run through-hole is blockaded by the seal member as an ink feed hopper, and by carrying out sealing enclosure of the case in the state of reduced pressure at a packing bag, the aforementioned space can maintain a reduced pressure state over the long period of time in a packing bag, and can maintain the deaeration state of ink.

[0088]

[Embodiments of the Invention] Hereafter, 1 operation gestalt which materialized this invention is explained with reference to a drawing.

[0089] Drawing 1 shows the state where the ink cartridge by this operation gestalt was connected to the recording head, the head electrode holder 50 which supported the recording head 72 is carried in the carriage 52 by which scanning movement is carried out along with a record medium, and it is equipped with an ink cartridge 1 removable at the head electrode holder 50. the ink feed hopper 17 which formed the ink cartridge 1 in the inferior surface of tongue - the joint by the side of the head electrode holder 50 -- a member 74 -- fitting in -- a manifold -- ink is distributed to many ink jet channels of a recording head 72 through a member 73 A recording head 72 spouts ink from each ink jet channel by driving the actuator which consists of a piezoelectric device or a heater element so that it may be well-known.

[0090] The ink cartridge 1 by the gestalt of this operation consists of the case 2 built by transparent or translucent resin material in the shape of a rectangle, and the up-and-down covering device material 3 and 4. A case 2 consists of the 1st side attachment wall 2a and 2b of the couple which counters, and the 2nd side attachment wall 2c and 2d of the couple which connects between the side attachment walls of the couple, and it is making tubed [of the rectangle which opened the vertical ends side wide]. Heat welding of the up-and-down covering device material 3 and 4 is carried out so that vertical both the opening side of a case 2 may be worn. Furthermore, a case 2 is connected with the 1st side attachment wall (it sets to drawing 3 and is a wall on either side) 2a and 2b, the bridge walls 5 and 6 mostly prolonged in parallel, and both the bridge-walls soffit of those, and partition formation of the interior is carried out by a pars-basilaris-ossis-occipitalis opening side, the pars-basilaris-ossis-occipitalis bridge wall 7 mostly prolonged in parallel, and the bridge walls 7a, 7b, and 7c perpendicularly prolonged towards a pars-basilaris-ossis-occipitalis opening side from the pars-basilaris-ossis-occipitalis bridge wall 7. Bridge walls 5 and 6, the pars-basilaris-ossis-occipitalis bridge wall 7, and bridge walls 7a and 7b are prolonged in mediation ***** in for the 2nd side-attachment-wall 2c and 2d.

[0091] The 1st locus 9 which opened the upper surface wide in the upper limit of a case 2 were formed in the place surrounded by bridge walls 5 and 6, the pars-basilaris-ossis-occipitalis bridge wall 7, and the 2nd side attachment wall 2c and 2d, and the porosity material 8, such as a polyurethane foam which absorbed ink, is held in it. The 2nd locus 10 are formed in the place of the 1st side attachment wall surrounded by 2a, a bridge wall 5, and the 2nd side attachment wall 2c and 2d on the other hand, and the air free passage way 11 is formed in the place surrounded by another side 2b of the 1st side attachment wall, a bridge wall 6, and the 2nd side attachment wall 2c and 2d. The 2nd locus 10 and air free passage way 11 opened the upper limit wide on the upper surface of a case 2, respectively, and bent the soffit along the inferior surface of tongue of the pars-basilaris-ossis-occipitalis bridge wall 7, and have opened

the soffit wide on the inferior surface of tongue of a case 2.

[0092] The upper covering device material 3 covers the upper limit of the 1st locus 9, the 2nd locus 10, and the air free passage way 11, respectively, fixes by heat welding to the upper limit of side attachment walls 2a, 2b, 2c, and 2d and bridge walls 5 and 6, and is making each locus 9 and 10 and the path 11 become independent. The lower covering device material 4 covers the soffit of the 2nd locus 10 and the air free passage way 11, respectively, fixes by heat welding to the soffit of side attachment walls 2a, 2b, 2c, and 2d and bridge walls 7a and 7b, and is making the 2nd locus 10 and path 11 become independent. Consequently, the 2nd locus 10 and air free passage way 11 make about L typefaces from vertical section part 10a which meets side attachment walls 2a and 2b, and the level portions 10b and 11b located in the 1st locus 9 bottom. In addition, a part for a vertical section, 11a, and level partial 11b of the air free passage way 11 are open for free passage through the free passage mouth 30 prepared in bridge-wall 7b.

[0093] The run through-hole 15 which connects the 1st locus 9 and 2nd locus 10 is formed in the pars-basilaris-ossis-occipitalis bridge wall 7. Ink is held in the 1st locus 9 and 2nd locus 10, respectively, and the ink room is formed by both locus. When it comes to [both] the path at the time of ink restoration, the 2nd locus 10 turn into a relay room at the time of supplying ink to a recording head 72 from the 1st locus 9 so that it may mention later. The 1st locus 9 are formed greatly enough as compared with the 2nd locus 10. The air free passage way 11 supplies the atmosphere to the 1st locus 9, when the ink of the 1st locus 9 is consumed. Between the 2nd locus 10 and the air free passage way 11, bridge-wall 7a of the inferior surface of tongue of the pars-basilaris-ossis-occipitalis bridge wall 7 dissociates. As mentioned above, in the both-sides section of a case 2, bridge walls 5 and 6 are mostly formed in parallel with side-attachment-wall 2a and 2B, and are increasing case intensity by making a flank into about 2-fold box-frame construction. Moreover, resin fabrication of the case 2 of such a configuration can be easily carried out with the metal mold separated up and down.

[0094] The ink restoration mouth 13 is formed corresponding to the upper-limit opening side of the 2nd locus 10, and the upper-limit opening side of the 1st locus 9 is countered, and the reduced pressure mouth 14 for decompressing the inside of a case at the time of ink restoration is formed in the upper covering device material 3. the above-mentioned free passage which opens the 2nd locus 10 and 1st locus 9 for free passage mutually -- a hole 15 is arranged at an opposite side, it gathers the charging efficiency of ink so that it may mention later, and it is made, as for an edge, i.e., **, side distant from the side in which the ink restoration mouth 13 and the reduced pressure mouth 14 are arranged, to gather the consumption efficiency of ink

[0095] Moreover, the 1st locus 9 and air free passage way 11 are opened for free passage by the path 16 formed in it as straddled the upper limit of a bridge wall 6 to the upper covering device material 3. That is, a path 16 is formed in the upper surface of the upper covering device material 13 at a concave, the end is opened for free passage by the 1st locus 9 through the reduced pressure mouth 14, and the other end is opened for free passage by the air free passage way 11 through penetration mouth 16a. The upper covering device material 13 has the wall 27 which projects in the 1st locus 9 and contacts the upper surface of the porosity material 8. That is, in the 1st locus 9 and a corresponding portion, the upper covering device material 3 was formed thickly, and has compressed the ink absorber 8 a little. a wall 27 is mentioned later -- as -- the 1st inside and interval of locus 9 -- opening -- and reduced pressure -- the hole 14 is located inside the 1st locus 9 rather than the periphery of the wall 27

[0096] corresponding to the soffit opening side of the 2nd locus 10, the ink feed hopper 17 for supplying the ink of the 2nd locus 10 to a recording head forms in the lower covering device material 4 -- having -- the soffit opening side of the air free passage way 11 -- corresponding -- an air free passage -- the hole 18 is formed, respectively As shown in drawing 6 , the run through-hole 15 and the ink feed hopper 17 shift mutually, in view of a flat surface, it is located, and the rib-like obstruction 31 is formed on the shortest path which connects the run through-hole 15 and the ink feed hopper 17 to the 2nd locus 10. This obstruction 31 is made to protrude on one from the bridge wall 7 of a case 2, and although it is desirable to form by making it join to the internal surface of the lower covering device material 4, even if it makes it make it protrude on one from the lower covering device material 4, it does not interfere. 7d (drawing 3) of inferior surfaces of tongue of the pars-basilaris-ossis-occipitalis bridge wall 7 -- a free passage -- it is an inclined plane so that it may go up toward a part for the vertical section of the 2nd locus 10 from the soffit of a hole 15 One edge of the above-mentioned obstruction 31 was located in the flank of the run through-hole 15, and the other end is prolonged till the place near a part for the vertical section of the 2nd locus 10. When this draws ink from the 2nd locus 10 with the negative pressure produced by ink jet from a recording head 72, the ink style which came out of the run through-hole 15 from the 1st locus 9 bypasses an obstruction 31 like an arrow 32, goes into level partial 10b of the 2nd locus again through vertical section part 10a of the 2nd locus, and results in the ink feed hopper 17.

[0097] As shown in drawing 4 , the ink restoration mouth 13 and the reduced pressure mouth 14 are blockaded by the 1st sealant 21 and 22 stuck on the superficies of the upper covering device material 3 by heat welding etc. after ink restoration. The sealant 22 secured the path 16 and is wearing the upper surface. It is blockaded by the 2nd sealant 23

on which the air run through-hole 18 is stuck by heat welding etc. possible [ablation] as the ink feed hopper 17. Since the ink restoration mouth 13 and the ink feed hopper 17 are another, the 2nd sealant 23 is beforehand stuck on the ink feed hopper 17 before restoration of ink. For this reason, since it does not say that the surroundings of an ink feed hopper have got wet in the ink at the time of restoration like the conventional thing to which the ink feed hopper 17 serves as an ink restoration mouth, even if it is weak heat welding which is the grade which does not deform an ink feed hopper, sufficient seal effect can be acquired. Since sealants 21 and 22 do not need to exfoliate, they may carry out heat welding firmly to the grade which deformation produces somewhat in the upper covering device material 3. Each sealants 21, 22, and 23 are built with the resin, the metallic foils, or those charges of plywood of air impermeability.

[0098] The reticulated filter 24 made from stainless steel is attached in the field by the side of the 2nd locus 10 of the ink feed hopper 17. It has the opening of the grade to which the ink in the 2nd locus 10 does not leak this filter 24 in the natural state with surface tension.

[0099] As shown in drawing 10 , in the middle of vertical section part 11a of the air free passage way 11, the bridge wall 29 which divides the air free passage way 11 up and down is formed. The bridge wall 29 had the difference of elevation in the vertical direction of the air free passage way 11, and is prolonged, a through hole 28 is formed in the high portion, and the crevice which becomes ink ** 29a from the upper-limit side of the through hole 28 in a low position is formed. In case a bridge wall 29 carries out resin fabrication of the case 2, it can be fabricated by the lever section of the metal mold separated up and down, and does not need special processing.

[0100] moreover, the air free passage of the lower covering device material 4 -- ink ** 4a is formed in the circumference also by protruding peripheral wall 18a of a hole 18 on tubed up an ink cartridge falls by this -- carrying out -- the 1st locus 9 to the path 16 -- ** -- the ink which leaked later on collects on the ink reservoir 29 Moreover, even if the ink in the ink reservoir 29 may go into a through hole 28 by leaning an ink cartridge etc., it collects on ink reservoir 4a of the lower part. therefore, the air free passage way 11 and an air free passage -- a hole 18 is not closed or ink does not leak outside

[0101] As shown in drawing 6 and drawing 19 , the level portions 10b and 11b of the 2nd locus 10 and the air free passage way 11 are adjoined, and space 33 is formed in the case 2. Space 33 is divided by bridge-wall 7a and bridge-wall 7c between which it mediated among 7b, it is covered by the lower covering device material 4, and does not open the undersurface for free passage in the 2nd locus 10, the 1st locus 9, and the air free passage way 11, but is open for free passage with the case exterior with the puncturing 34 which prepared in the lower covering device material 4. On the occasion of shipment, the ink cartridge 1 filled up with ink is made into the state where sealing hold was carried out in the state of reduced pressure into the packing bag 81, as shown in drawing 19 . The packing bag 81 contains an ink cartridge 1 inside tubed part material, and it carries out both the openings edge welding 82 while it carries out negative pressure suction of the interior. The packing bag 81 is built with the resin, the metallic foils, or those charges of plywood of air impermeability. The cross section of the ink cartridge 1 shown by drawing 19 is equivalent to the C-C line cross section of drawing 9 . Puncturing 34 is not covered by the 2nd sealant 23. When the inside of the packing bag 81 is made into a reduced pressure state, the above-mentioned space 33 makes the inside of space 33 a reduced pressure state similarly, and it acts so that the inside of the sealing packing bag 81 may be maintained in the reduced pressure state over a long period of time with the capacity. This prevents the air infiltration to the ink within a case in the intact state.

[0102] Drawing 11 , drawing 12 , and drawing 13 show the composition of path 16 portion in detail. Drawing 11 The shown composition is created as reference for explaining a trouble. Path 16b penetrates upper covering device material 3a, is formed, and is making the 1st locus 9 and air free passage way 11 open for free passage mutually in this drawing. Although the upper surface of path 16b is not illustrated, it is being worn by the sealant 22. In such a case, ink tends to gather for the bridge wall 6 and side attachment walls [2c and 2d] edge (ridgeline) E1 to make and the edge E2 which a bridge wall 6 and the upper covering device material 3 make by capillarity. And since the above-mentioned edges E1 and E2 are following the edge E3 of the inside of path 16b, and a bridge wall 6 to make, the ink gathering in the above-mentioned edges E1 and E2 flows on an edge E3 by capillarity, as Arrow R shows, and they flow out along with the edge E4 in the air free passage way 11 further. When ink infiltrates into the direction of the air free passage way 11 from the 1st locus 9, and a case is transparent or translucent, it will become unsightly, and further, it leaks out to the case exterior, or the air free passage way 11 is taken up, and there is fault the ink supply to a recording head 11 from the 1st locus 9 becomes impossible.

[0103] As shown in drawing 12 , in order to cancel the above-mentioned fault, the periphery of the above-mentioned wall 27 juttred out of the upper covering device material 3 over the 1st locus 9 side has set the 1st inside and interval K of locus 9. The reduced pressure mouths 14 are a cylindrical shape, a rectangle with the radius of circle, etc., and are located in nothing and the edge distant from the bridge wall 6 of a wall 27 in the configuration which does not have

an edge in an inside. By this composition, the inside edge by the side of the 1st locus 9 of a bridge wall 6 is not connected with a path 16 and the air free passage way 11 only with the inside edge which two flat surfaces make. That is, the inferior surface of tongue of a wall 27, the periphery of a wall 27, and the inside of the reduced pressure mouth 14 are configurations without the inside edge which two flat surfaces make, and the inside edge by the side of the 1st locus 9 of a bridge wall 6 will be connected with the air free passage way 11 through these field sections. Therefore, it is prevented that the ink in which the wall 27 carried out compressing the porosity material 8 etc., and oozed, and the ink gathering in the inside edge by the side of the 1st locus 9 flow into the path 16 and air free passage way 11 side by capillarity. Moreover, since there is no inside edge, the reduced pressure mouth 14 is moreover located in the heavy-gage part of the upper covering device material 3 and there is height of enough of the reduced pressure mouth 14 also in the inside of the reduced pressure mouth 14 which touches the porosity material 8, it is also prevented that the ink in the porosity material 8 trespasses the inside of the reduced pressure mouth 14 upon the ***** path 16. Temporarily, the crevice between the periphery of a wall 27 and a bridge wall 6 is small, and even if ink may go up the crevice by capillarity, since the upper limit of a bridge wall 6 is welded at the covering device material 3, ink does not trespass upon the air free passage way 11.

[0104] In addition, when the reduced pressure mouth 14 is made into the configuration which has an edge in an inside, the effect same also as cross-section configurations without an edge, such as a rectangle with the semi-cylindrical shape or the radius of circle, is acquired in the inside of a path 16.

[0105] Drawing 13 shows the composition which improved the circulation space further, and in drawing 12, the reduced pressure mouth 14 is formed, without touching a wall 27 between the periphery of a wall 27, and a bridge wall 6, although the wall 27 was penetrated. That is, since the inside of the reduced pressure mouth 14 has set space, without contacting the porosity material 8 directly, it is prevented further that the ink in the porosity material 8 carries out ***** exsorption of the inside of the reduced pressure mouth 14.

[0106] Moreover, the ink residue detection sensor 60 is formed in the carriage 52 of an ink jet printer. Namely, although ink is full in the state of [intact] the ink cartridge 1, without leaving space in the porosity material 8 in the 1st locus 9, and the 2nd locus 10 If ink is consumed by record operation and the ink in the 1st locus 9 is lost, with the pressure to which a recording head 72 attracts ink, air will invade into the 2nd locus 10 from the 1st locus 9, an opening portion will arise above the 2nd locus 10, and an ink oil level will fall. The ink residue detection sensor 60 detects the existence of an ink residue from change of reflection of the light by the existence of the ink in the paries-medialis-orbitae side of these 2nd locus 10.

[0107] The aforementioned ink residue sensor 60 carries out outgoing radiation of the light to the detecting-element grade alpha set as the predetermined height position of side-attachment-wall 2a which a light emitting device 61 faces the 2nd locus 10 of a case 2, as shown in drawing 1. On both sides of the detecting-element grade alpha, a light emitting device 61 and a photo detector 62 open a predetermined interval in the horizontal direction of the 2nd locus 10, and are arranged in it so that a photo detector 62 (drawing 5) can receive the reflected light from the side-attachment-wall inside in the detecting-element grade alpha. Because of this purpose, if the case 2 is transparent or translucent in order that a detecting-element grade alpha portion may secure a translucency at least, it is good.

[0108] Moreover, the aforementioned detecting-element grade alpha is set as the ridgeline portion (corner portion) prolonged in the vertical direction formed when the inside of 2d of side attachment walls which adjoin in 2nd room 10 of an ink cartridge 1 at the inside of side-attachment-wall 2a and it crosses, as shown in drawing 5. Thus, if the detecting-element grade alpha is set as the ridgeline portion (corner portion) of the 2nd locus 10, so that it may mention later When the height of the oil level of the ink in the 2nd locus 10 falls rapidly from level h1 to level h2, as shown in drawing 14 The ink L which had adhered near the corner section of a side-attachment-wall 2a inside though the ink L adhering to the side-attachment-wall 2a inside was held to the level h1 neighborhood in the center section of side-attachment-wall 2a The same existence of the ink in the level h 2nd locus 10 in the detecting-element grade alpha since it moves immediately to about two as the height of an ink oil level is detectable with a sufficient precision with the capillarity which a corner portion has. Thus, an oil level's falling rapidly is connecting to a recording head 72 the suction means it being well-known in the ink oil level h2 shaking to h1 for injection functional recovery of a recording head 72, with scanning movement of carriage, and attracting a lot of ink, and it is the case where an ink oil level falls rapidly.

[0109] Moreover, although it is also possible to set the detecting-element grade alpha as the ridgeline portion which prepares the rib which projects in the 2nd locus 10 from a side-attachment-wall 2a inside, and is prolonged in the height direction of the 2nd locus 10, and is formed of this rib and a side-attachment-wall 2a inside The detection precision by the ink residue sensor 60 can be raised without complicating structure of an ink cartridge 1 by setting the detecting-element grade alpha as the corner portion which exists in the usual ink cartridge, as mentioned above.

[0110] Moreover, the futility of the ink generated in case the ink residue at the time of exchanging an ink cartridge 10

can be made small as much as possible and an ink cartridge 10 is exchanged by detecting the ink residue of the 2nd locus 10 in which oil-level change of ink appears at the end by the ink residue sensor 60 after consuming the ink of the 1st locus 9 mostly as mentioned above can be stopped to the minimum.

[0111] moreover, to the inside of side-attachment-wall 2a which attends the 2nd locus 10 to which the detecting-element grade alpha is set as shown in drawing 15 The direction which intersects perpendicularly with a light emitting device 61 and a photo detector 62, and the flat surface containing the detecting-element grade alpha, namely, on the superficies of side-attachment-wall 2a to which many detailed concave protruding lines 63 prolonged in the vertical direction of an ink cartridge 1 are formed in, and the detecting-element grade alpha is set Many detailed concave protruding lines 64 prolonged to a light emitting device 61 and a photo detector 62, the flat surface containing the detecting-element grade alpha, and a parallel direction, i.e., the cross direction of an ink cartridge 10, are formed.

[0112] In the state where ink exists to the height of the detecting-element grade alpha of the 2nd locus 10, the light by which outgoing radiation was carried out from the light emitting device 61 progresses into ink from the refractive index of side-attachment-wall 2a and ink (arrow B), and hardly progresses to a photo-detector 62 side. And in the state where there is no ink in the detecting-element grade alpha, it reflects by the inside of side-attachment-wall 2a, and light progresses toward a photo detector 62. Under the present circumstances, if many detailed concave protruding lines 63 prolonged in the vertical direction in the inside of side-attachment-wall 2a of the case main part 11 are formed, as a solid line shows to drawing 15 When the light by which outgoing radiation was carried out from the light emitting device 61 reflects by the inside of side-attachment-wall 2a of the case main part 11, It is mostly scattered about horizontally (direction parallel to a light emitting device 61 and a photo detector 62, and the flat surface containing the detecting-element grade alpha) by this concave protruding line 63. It progresses to the photo-detector 62 side, spreading within the flat surface containing the detecting-element grade alpha of the light emitting device 61 of a sensor 60 and a photo detector 62, and the aforementioned case main part 11. The reflected light in case the concave protruding line is not formed in the inside of side-attachment-wall 2a is shown in this drawing with a two-dot chain line. Therefore, as a solid line and a two-dot chain line show to drawing 16 , even when the distance between a sensor 60 and the detecting-element grade alpha changes delicately, a photo detector 62 can receive the reflected light certainly. That is, even when the attaching position to the carriage 52 of a sensor 60 varies in the manufacture stage of an ink jet printer or the wearing position of an ink cartridge 1 shifts delicately on the occasion of exchange of the ink cartridge 1 by the user, detection of an ink residue can be ensured. In addition, drawing, although light illustrated for convenience in the state of explanation of changing outgoing radiation into an parallel state from a light emitting device 61, that by which outgoing radiation is carried out so that it may spread can also attain the same effect.

[0113] Moreover, if many detailed concave protruding lines 64 prolonged on the external surface of side-attachment-wall 2a at a cross direction are formed as mentioned above, as shown in drawing 17 The light reflected by the appearance of side-attachment-wall 2a of the case main part 11 is scattered about in the vertical direction by the concave protruding line 64. Since it progresses to the photo-detector 62 side while the reflected light in the external surface of side-attachment-wall 2a spreads on the outside of the flat surface containing the light emitting device 61 of a sensor 60 and a photo detector 62, and the detecting-element grade alpha, a photo detector 62 stops easily being able to receive the reflected light in the external surface of side-attachment-wall 2a which does not contribute to detection of an ink residue. Therefore, the ratio of the reflected light component in the inside of side-attachment-wall 2a which contributes to detection of an ink residue among the reflected lights which a photo detector 62 receives becomes high, and the detection precision of an ink residue improves. When the concave protruding line of the inside of side-attachment-wall 2a is what is prolonged horizontally and the distance of a sensor 60 and the detecting-element grade alpha changes temporarily as shown in drawing 16 since light is scattered about in the vertical direction, the permission position where a photo detector 62 can receive the reflected light is remarkably restricted as compared with the above-mentioned operation form.

[0114] Although the case 2 constituted as mentioned above is fabricated by metal mold the metal mold corresponding to the inside of side-attachment-wall 2a to which, as for the metal mold used, the detecting-element grade alpha is set, while the field is polished in the direction which intersects perpendicularly with the flat surface containing a light emitting device 61 and a photo detector 62, and the detecting-element grade alpha the metal mold corresponding to the external surface of side-attachment-wall 2a to which the detecting-element grade alpha is set -- a field polishes in parallel to the flat surface containing a light emitting device 61 and a photo detector 62, and the detecting-element grade alpha -- having -- **** -- metal mold -- by applying such polishing to a field each metal mold -- many detailed concave protruding lines prolonged in the predetermined direction are formed in a field Therefore, by using such metal mold, as mentioned above, the ink cartridge 1 in which the concave protruding lines 63 and 64 of a large number prolonged in the predetermined direction, respectively on the inside and external surface of side-attachment-wall 2a to which the detecting-element grade alpha is set were formed can be manufactured easily.

[0115] In addition, although the light emitting device 61 and the photo detector 62 are horizontally arranged with the form of this operation, it is also possible for it not to be limited to this and to arrange a light emitting device 61 and a photo detector 62 in the vertical direction of an ink cartridge 1. However, you have to make reverse the sense of the concave protruding lines 63 and 64 formed in the inside-and-outside side of side-attachment-wall 2a in that case, respectively.

[0116] Next, if the manufacture method of an ink cartridge 1 is explained, first, resin fabrication of the case 2 is carried out, and the case 2 will be washed and it will dry. Since the vertical ends side is wide opened at this time, a case 2 can be easily fabricated with the metal mold separated up and down. Although it is often necessary to wash a case so that the physical properties of ink may not change, in the configuration of this case, a penetrant remover tends to reach the interior and can wash it easily. Moreover, dryness can also be performed, without leaving a penetrant remover.

[0117] And as shown in drawing 4, the porosity material 8 is inserted in the 1st locus 9 from the top open end of a case 2, and by pressing this porosity material 8 by the upper covering device material 3, it changes into a compression state and holds. Heat welding of the upper covering device material 3 is carried out at the upper limit of the upper-limit opening periphery of a case 2, and bridge walls 5 and 6. Moreover, the lower covering device material 4 carries out heat welding, and is fixed to the soffit of the soffit opening periphery of a case 2, and bridge walls 7a, 7b, and 7c. A sealant 23 is stuck on ink feed-hopper [of the lower covering device material 4] 17, and air run through-hole 18 portion possible [exfoliation] so that these may be covered. Thus, the upper and lower sides of a case 2 are mostly formed in the shape of opening, various kinds of above locus can be formed by equipping this with the covering device material 3 and 4 from the upper and lower sides, and these attachment is easy. Moreover, since the air run through-hole 18 is located in a line with the whole surface of a cartridge as the ink feed hopper 17, it is not necessary to take about the wrap sealant 23 along with the periphery of a cartridge like before, and they can be stuck easily.

[0118] Furthermore, when ink restoration work into an ink cartridge 1 is explained, as it is shown in drawing 18, where the seal of the air run through-hole 18 is carried out to the ink feed hopper 17 of the lower covering device material 4 as mentioned above, ink restoration equipment 101 is stuck to the ink restoration mouth 13 of the upper covering device material 3, a decompression device 102 is stuck to the reduced pressure mouth 14, and it carries out by operating each equipment. Since the ink restoration mouth 13 and the reduced pressure mouth 14 are located in a line with the whole surface of a cartridge, each equipment of both should just approach from the one side of an ink cartridge 1. The air in the 1st locus 9 is attracted from the reduced pressure mouth 14 in advance of ink restoration. The 1st and 2nd locus 9 and 10 are decompressed, ink passes along the 2nd locus 10 from the ink restoration mouth 13, and the porosity material 8 in the 1st locus 9 is filled up with it from the run through-hole 15 by it. Since it results in the run through-hole 15 and the reduced pressure mouth 14 which separated most after the 2nd locus' 10 serving as an ink restoration way, and ink's going into the 2nd locus 10 from an end, passing along it and the run through-hole 15 left most at this time and going into the 1st locus 9 While the 2nd locus 10 the very thing is also filled up with ink at full, both the 1st locus 9 can also be efficiently filled up with ink. Moreover, as mentioned above, since the flank of a case 2 serves as double box-frame construction and it is reinforced, it is rare in the case of reduced pressure for a case 2 to deform, and this meaning can also fill up both the locus 9 and 10 with ink efficiently at it. In addition, the inside of the air free passage way 11 is also decompressed simultaneously with the 1st locus 9, and after sticking a sealant, it is maintained by the reduced pressure state.

[0119] What removed the air bubbles with which the ink filled up with the above-mentioned process is dissolved in ink, and air as much as possible (the deaerated so-called ink) is used. This is for avoiding that air bubbles and air invade into a recording head 72, and produce poor injection of ink. Moreover, reduced pressure seal of the ink cartridge is carried out for preventing that air bubbles and air melt into the deaerated ink again with the packing bag 8 as mentioned above.

[0120] Sealants 21 and 22 are stuck on the ink restoration mouth 13 and the reduced pressure mouth 14 after ink restoration. Sealants 21 and 22 should leave only a respectively required portion, after sticking one sealant. Thus, since what is necessary is to bring restoration equipment 101 and a decompression device 102 close from one side to a case 2, and just to carry out a seal from one side to a case 2 in a manufacture stage, workability is good.

[0121] In this way, as mentioned above, in the packing bag 81, the manufactured ink cartridge 1 is shipped, where sealing hold is carried out in the state of reduced pressure.

[0122] the time of use of the ink cartridge 1 in a user -- a user -- the ink feed hopper 17 of an ink cartridge 1, and an air free passage -- the sealant 23 stuck on the hole 18 -- removing -- the ink feed hopper 17 -- the manifold 73 of a recording head 72 -- joint -- it is made to join together through a member 74 And a suction means is connected to a recording head 72, and a recording head 72 is filled up with ink from an ink cartridge 1 so that it may be well-known.

[0123] Negative pressure is made to act with the absorptive power of the porosity material 8 in the 1st locus 9, i.e., capillarity, from the 2nd locus 10 to the ink supplied to a recording head during record operation. The actuator of a

recording head 72 is carrying out ink jet operation, generates negative pressure in the jet direction, and attracts ink from an ink cartridge 1. if the ink in the 2nd locus 10 flows out of the ink feed hopper 17, ink will supply in the 2nd locus 10 from the porosity material 8 in the 1st locus 9 -- having -- consumption of the ink in the 1st locus 9 -- following -- an air free passage -- pass the air free passage way 11 from a hole 18 -- the atmosphere is introduced into the 1st locus 9 Since the upper limit of the 2nd locus 10 is closed by the sealant 21, since atmospheric pressure does not work in the ink of the 2nd locus 10, after the ink in the 1st locus 9 is consumed mostly, the ink in the 2nd locus 10 comes to be consumed in the state where full restoration of the ink is carried out at the 2nd locus 10. That is, with the pressure to which a recording head 72 attracts ink, if the ink in the 1st locus 9 is lost, while the ink of the 2nd locus 10 is consumed, air will invade into the 2nd locus 10 from the 1st locus 9, an opening will arise from the upper part for a vertical section 10 of the 2nd locus 10, and an ink oil level will fall.

[0124] Thus, since the atmosphere is introduced from a side with the far run through-hole 15 in the 1st locus 9, while the ink of the 1st locus 9 is used effectively, the whole ink also including the ink of the 2nd locus 10 is used effectively. Moreover, since full is filled up from the beginning as an ink restoration way, the 2nd locus 10 are not incorrect-detected in restoration insufficient shell residue detection of the ink here. Since the work which furthermore removes a sealant 23 is also only the whole surface of a cartridge, it is easy.

[0125] Moreover, as mentioned above, when an obstruction 31 is between the run through-hole 15 and the ink feed hopper 17 When ink is drawn in the 2nd locus 10 through the run through-hole 15 by the pressure to which a recording head 72 attracts ink from the 1st locus 9, When the foam was mixing into the ink, or the ink of the 1st locus 9 is consumed as mentioned above and air comes to be drawn in the 2nd locus 10, it can prevent that the foam and air flow into a recording head 72. That is, as an arrow 32 shows, when an ink style bypasses an obstruction 31 to drawing 6, a foam and air escape to the upper part of the vertical section part 10a by buoyancy, and are not given to the ink feed hopper 17 in the place corresponding to vertical section part 10a of the 2nd locus 10. 7d of ceiling sides of level partial 10b of the 2nd locus, i.e., the inferior surface of tongue of the pars-basilaris-ossis-occipitalis bridge wall 7, -- a free passage -- a foam and air flow to the upper part of vertical section part 10a by inclining so that it may go up toward vertical section part 10a of the 2nd locus 10 from the soffit of a hole 15, without remaining in the inferior surface of tongue of the pars-basilaris-ossis-occipitalis bridge wall 7 Therefore, a foam and air can invade into a recording head 72, and a bird clapper can be prevented to poor ink jet.

[Translation done.]

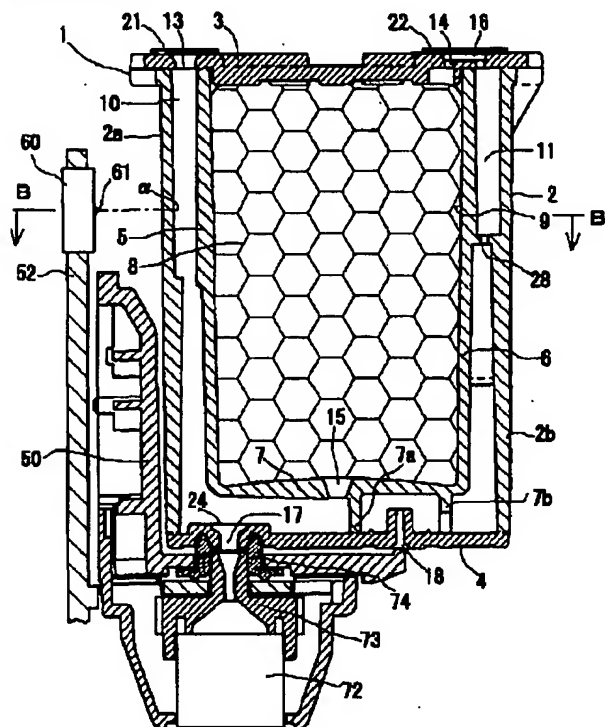
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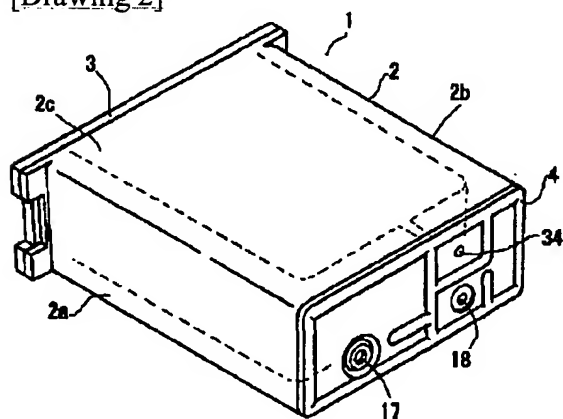
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DRAWINGS

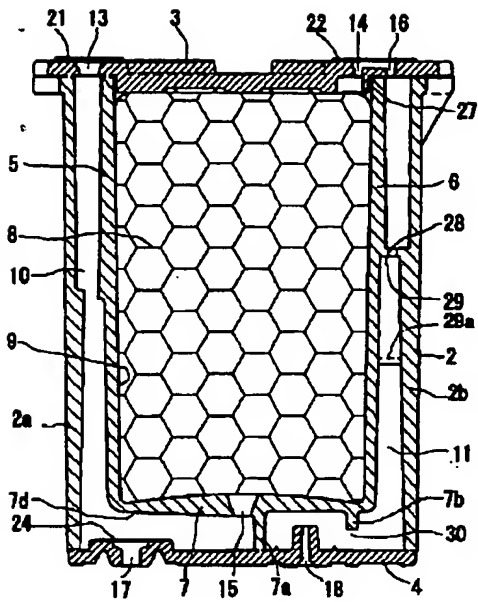
[Drawing 1]



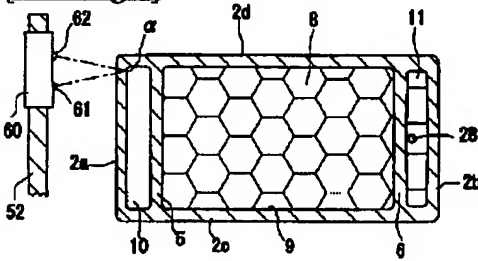
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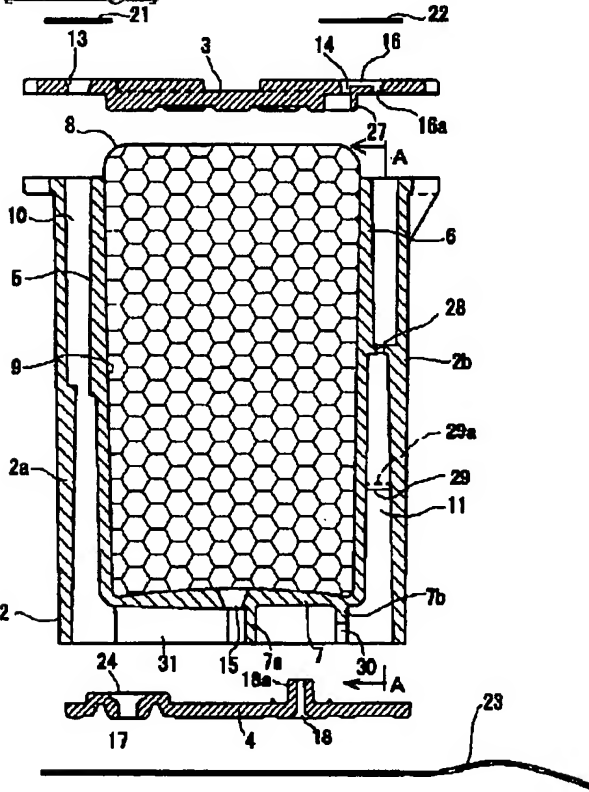
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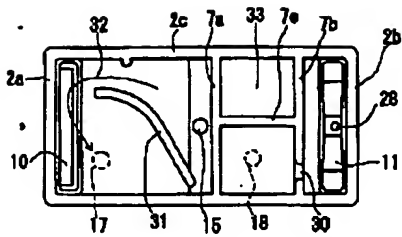
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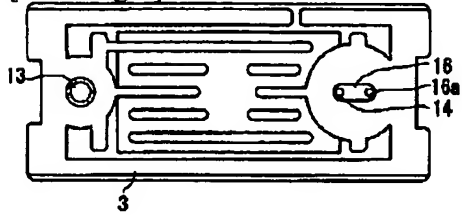
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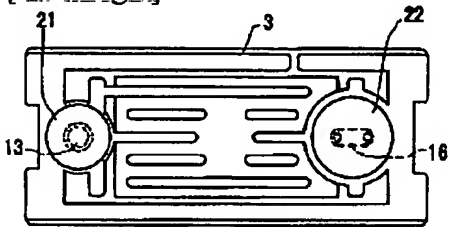
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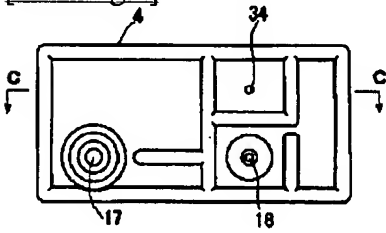
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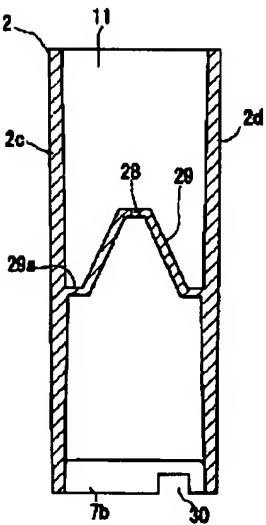
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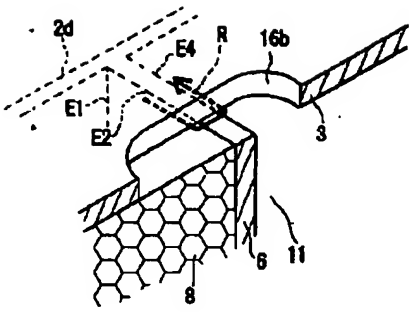
[Drawing 9]



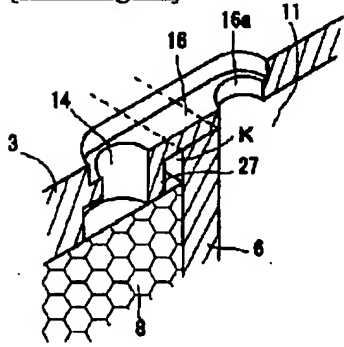
[Drawing 10]



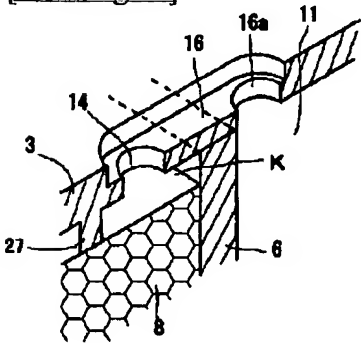
[Drawing 11]



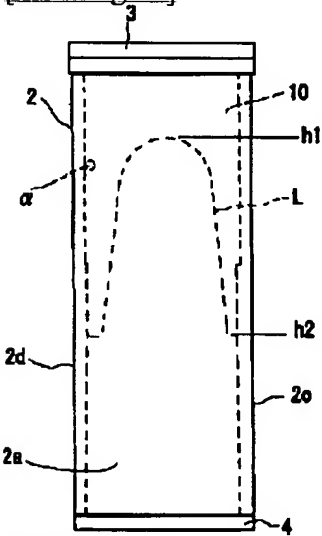
[Drawing 12]



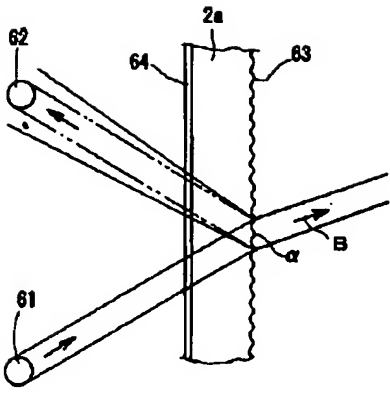
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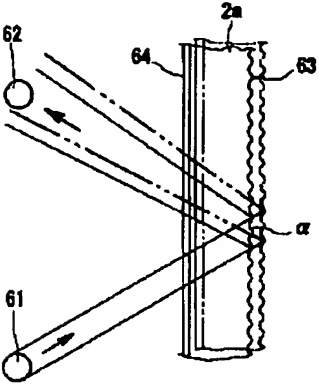
[Drawing 14]



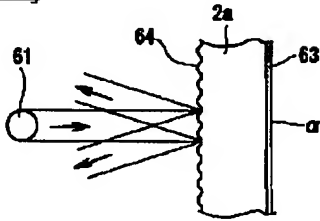
[Drawing 15]



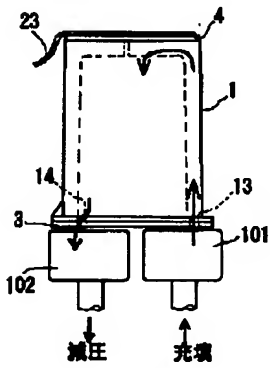
[Drawing 16]



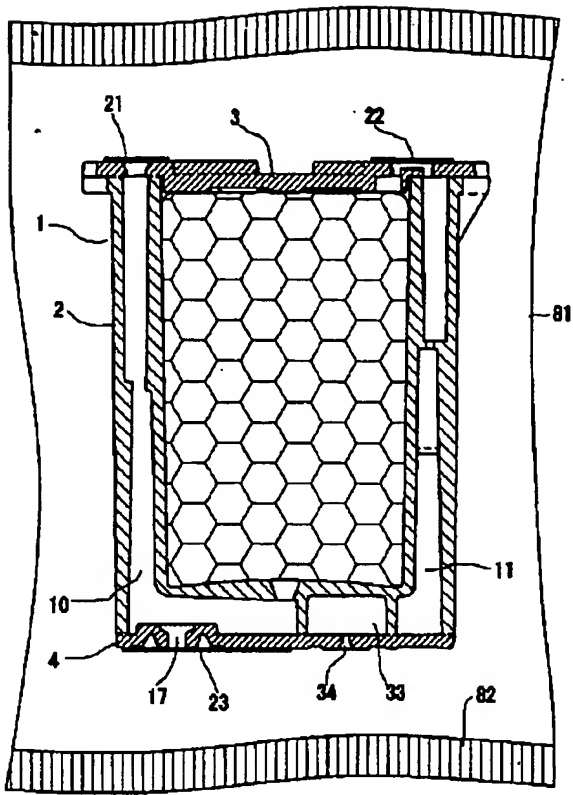
[Drawing 17]



[Drawing 18]



[Drawing 19]



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CORRECTION or AMENDMENT

[Official Gazette Type] Printing of amendment by the convention of 2 of Article 17 of patent law.

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B41J 2/175 .

[FI]

B41J 3/04 102 Z .

[Procedure revision]

[Filing Date] December 20, Heisei 14 (2002. 12.20)

[Procedure amendment 1]

[Document to be Amended] Specification.

[Item(s) to be Amended] Whole sentence.

[Method of Amendment] Change.

[Proposed Amendment]

[Document Name] Specification.

[Title of the Invention] Ink cartridge.

[Claim(s)]

[Claim 1] In the ink cartridge which holds the ink supplied to a recording head

The case which opened at least one field wide,

The 1st locus which hold the porosity material in which partition formation was carried out by the bridge wall into the aforementioned case, and which absorbed ink under opening to the open field side of a case, respectively, and the 2nd locus which hold ink,

It is wrap covering device material about the open field of the 1st locus of the above, and the 2nd locus.

either the ink restoration mouth for being formed in the open field of either the 1st locus of the above, or the 2nd locus, and filling up the 1st locus of the above, and the 2nd locus with ink and the 1st locus of the above or the 2nd locus -- in order to be formed in the open field of another side and to decompress the 1st locus of the above, and the 2nd locus -- a reduced pressure mouth connectable with the source of reduced pressure

The ink cartridge characterized by having the run through-hole which opens the 1st locus of the above, and the 2nd locus for free passage mutually by the opposite side the open aforementioned field side.

[Claim 2] In an ink cartridge according to claim 1

For the aforementioned open field, the aforementioned case is an ink cartridge characterized by having the ink feed hopper which supplies the ink of the 1st locus of the above, or the 2nd locus to a different field at a recording head.

[Claim 3] In an ink cartridge according to claim 2

As for the aforementioned case, the aforementioned open field and an opposite side are also opened wide.

The aforementioned ink restoration mouth and a reduced pressure mouth are formed in the aforementioned covering device material, respectively.

The aforementioned ink feed hopper is an ink cartridge characterized by forming the open field of an opposite side in the covering device material of a wrap 2nd.

[Claim 4] In an ink cartridge according to claim 3

the air free passage which the covering device material of the above 2nd opens for free passage to the 1st locus of the above -- the ink cartridge characterized by having a hole

[Claim 5] In the ink cartridge which holds the ink supplied to a recording head

In order to decompress the inside of the ink restoration mouth for being filled up with ink in this case, and this case to the 1st field of the case having ink, a reduced pressure mouth connectable with the source of reduced pressure is formed in it.

The ink feed hopper which supplies ink to a recording head is formed in the 1st field of the above, and the 2nd field of an opposite side.

It blockades in the 1st sealant which stuck the aforementioned ink restoration mouth and the reduced pressure mouth on the 1st field of the above.

The ink cartridge characterized by blockading the aforementioned ink feed hopper in the 2nd sealant stuck on the 2nd field of the above possible [exfoliation].

[Claim 6] the air free passage for which the 2nd field of the above opens the inside and outside of the aforementioned case for free passage further in an ink cartridge according to claim 5 -- a hole -- having -- the 2nd sealant of the above -- the aforementioned air free passage -- the ink cartridge characterized by blockading a hole possible [exfoliation]

[Detailed Description of the Invention]

[0001]

[The technical field to which invention belongs] this invention relates to the ink cartridge which holds the ink supplied to the recording head in image formation equipment.

[0002]

[Description of the Prior Art] Conventionally, image formation equipments, such as a printer of an ink-jet method, make an ink drop blow off from the nozzle of the recording head carried on carriage, and record a picture on a record medium, and jet of an ink drop is performed by driving actuators, such as an electric machine sensing element arranged by the recording head or an electric thermal-conversion element, and generating a pressure wave. Although ink is supplied from the ink cartridge carried in a recording head free [exchange], if air bubbles are mixing into the ink liquid supplied from an ink cartridge, having a bad influence on ink injection from the nozzle of a recording head is known.

[0003] the air free passage which is open for free passage with the atmosphere so that air may flow into a recording head at an ink cartridge corresponding to reduction by the ink feed hopper which supplies ink, and consumption of ink -- it has a hole Then, after filling up ink with the manufacturing process of an ink cartridge, each of these openings is made a closure state by the closure member. Moreover, what is done in the state of reduced pressure into a packing bag for the sealing hold of the ink cartridge which held ink (the so-called vacuum packing) is performed for air infiltration prevention into the ink leakage and case in an intact state at the time of shipment (for example, refer to JP,7-132611,A). and the time of use by the user -- a packing bag to an ink cartridge -- taking out -- a closure member -- removing -- an air free passage -- while carrying out opening of the hole, a recording head is made to open an ink feed hopper for free passage

[0004]

[Problem(s) to be Solved by the Invention] by the way -- general -- an ink cartridge -- setting -- an ink feed hopper and an air free passage -- for example, the air free passage with better the hole being mutually separated -- it is thought that it is easy to use the ink within a case without futility that air is hard to be drawn in an ink feed hopper simplistically from a hole etc., and an ink feed hopper arranges in a case inferior surface of tongue -- having -- an air free passage -- the hole is arranged in the case upper surface on the other hand -- the time of the ink restoration by the manufacturing process -- an ink feed hopper -- as an ink restoration mouth -- making it serve a double purpose -- an air free passage -- a hole is used as a reduced pressure mouth for decompressing the inside of a case, and it is made to fill up ink with decompressing the inside of a case from an ink feed hopper In this case, restoration equipment and the decompression device in a manufacturing process need to approach from both sides to a case for ink restoration. Moreover, the seal tape for closing an air run through-hole as an ink feed hopper after ink restoration It is necessary to take about from the upper surface of a case to an inferior surface of tongue (for example, refer to JP,9-70982,A). Rotating a case, since it could not work from Mukai on the other hand to the case when about [that a long tape is needed] and a seal tape was stuck using a roller mechanism, the seal tape had to be taken about from the upper surface of a case to the inferior

surface of tongue, and workability was bad.

[0005] Moreover, in order to be hard to weld, to cause poor welding, since a seal tape is welded in a manufacturing process near the ink [an ink restoration mouth-cum-] feed hopper which has got wet in ink, and to avoid this poor welding, when heat is kicked in many in the case of heat welding, an ink feed hopper deforms and there is a problem of it becoming impossible to perform joint with a recording head good.

[0006] Furthermore, as mentioned above, when the inside of a case is decompressed, the whole case may deform and it may be unable to be efficiently filled up with ink in a case. Moreover, when it is the composition that the porosity material which makes ink absorb is held in the case, to fill up with ink efficiently to all the corners in porosity material is demanded. On the other hand, in case a user uses it, a seal tape can be removed easily and it is requested that the ink within a case can be used efficiently.

[0007]

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[0014]

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[0016] this invention does easy the seal attachment work to each opening of a case which is made in order to solve the trouble mentioned above, makes it easy to approach to a case and performs the restoration equipment and the decompression device for ink restoration after ink restoration.

[0017] Moreover, it enables it to fill up even all the corners within a case with ink efficiently.

[0018]

[0019]

[0020]

[0021]

[0022]

[A The means for solving a technical problem and an effect of the invention] In order to attain the above-mentioned purpose invention of a claim 1 In the ink cartridge which holds the ink supplied to a recording head The 1st locus which hold the porosity material in which partition formation was carried out by the bridge wall into the case which opened at least one field wide, and the aforementioned case, and which absorbed ink under opening to the open field side of a case, respectively, and the 2nd locus which hold ink, The ink restoration mouth for forming the open field of the 1st locus of the above, and the 2nd locus in the open field of wrap covering device material, or the 1st locus of the above or the 2nd locus, and filling up the 1st locus of the above, and the 2nd locus with ink, The 1st locus of the above or the 2nd locus either And in order to be formed in the open field of another side and to decompress the 1st locus of the above, and the 2nd locus, It is in the ink cartridge characterized by having a reduced pressure mouth connectable with the source of reduced pressure, and the run through-hole which opens the 1st locus of the above, and the 2nd locus for free passage mutually by the opposite side the open aforementioned field side.

[0023] When filled up with ink, since what is necessary is just to carry out a seal from one side to a case after that, workability is [that what is necessary is just to bring restoration equipment and a decompression device close from one side to a case in a manufacture stage] good according to this composition, since an ink restoration mouth and a reduced pressure mouth are in one field of a case. Furthermore, since ink passes along the 2nd locus and 1st locus one by one towards a reduced pressure mouth from an ink restoration mouth at the time of ink restoration, both locus can be efficiently filled up with ink. In addition, this composition did not need to open vertical ends like the case mentioned later, and has just opened the whole surface of a case wide at least. moreover, it mentions later -- as -- ink -- the 1st locus to the 2nd locus -- ** -- not only supplying a recording head later on but the 2nd locus to the 1st locus -- ** -- it can also constitute so that a recording head may be supplied later on

[0024] It has the ink feed hopper by which invention of a claim 2 supplies the ink of the 1st locus of the above, or the 2nd locus to the field where the aforementioned case differs from the aforementioned open field in an ink cartridge according to claim 1 at a recording head. According to this composition, since the ink feed hopper is prepared apart from the ink restoration mouth or the reduced pressure mouth, an ink feed hopper can be blockaded in a sealant before ink restoration, after ink restoration and ink adhere to an ink feed hopper like before, and pasting of the sealant to an ink feed hopper is not checked. Ink seems therefore, not to begin to leak, in case the seal of the ink feed hopper is

carried out certainly, an ink cartridge can be shipped and a user equips a recording head with a cartridge.

[0025] As for invention of a claim 3, in an ink cartridge according to claim 2, the aforementioned open field and an opposite side are also opened wide, as for the aforementioned case, the aforementioned ink restoration mouth and a reduced pressure mouth are formed in the aforementioned covering device material, respectively, and the aforementioned ink feed hopper is formed in the covering device material of a wrap 2nd in the open field of an opposite side. A case is easy to form the 1st locus and the 2nd locus, since the ends side is opened wide, and although it is necessary to wash a case so that the physical properties of ink may not change, if the ends side is opened wide, washing and dryness are still easier according to this composition. Moreover, porosity material is inserted in the 1st locus, it is a wrap in covering device material, and assembly is easy. The work which sticks the sealant which carries out the seal of an ink restoration mouth and the reduced pressure mouth to one field, and the sealant which carries out the seal of the ink feed hopper to the field of another side in process in which an ink cartridge is conveyed in a manufacture stage further again can carry out easily with a roller etc.

[0026] the air free passage for which invention of a claim 4 opens the covering device material of the above 2nd for free passage to the 1st locus of the above in an ink cartridge according to claim 3 -- it has a hole according to this composition -- an ink feed hopper -- standing in a line -- an air free passage -- carrying out the seal of the ink feed hopper by the sealant in the process conveyed in a manufacture stage, since a hole is located, simultaneously an air free passage -- the seal also of the hole can be carried out

[0027] In order that invention of a claim 5 may decompress the inside of the ink restoration mouth for filling up the 1st field of the case having ink with ink in this case in the ink cartridge which holds the ink supplied to a recording head, and this case, A reduced pressure mouth connectable with the source of reduced pressure is formed. to the 1st field of the above, and the 2nd field of an opposite side Form the ink feed hopper which supplies ink to a recording head, and it blockades in the 1st sealant which stuck the aforementioned ink restoration mouth and the reduced pressure mouth on the 1st field of the above. It is in the ink cartridge characterized by blockading the aforementioned ink feed hopper in the 2nd sealant stuck on the 2nd field of the above possible [exfoliation].

[0028] According to this composition, in process in which an ink cartridge is conveyed in a manufacture stage, the work which sticks the 1st sealant which carries out the seal of an ink restoration mouth and the reduced pressure mouth to one field, and the 2nd sealant which carries out the seal of the ink feed hopper to the field of another side can be easily done using a roller etc. Since an ink feed hopper is not used on the occasion of restoration of ink, like before, an ink feed hopper gets wet in ink, and does not worsen seal nature. Moreover, in case a recording head is equipped with a cartridge in a user side, it exfoliates easily and wearing can be presented only with one 2nd sealant.

[0029] the air free passage for which, as for invention of a claim 6, the 2nd field of the above opens the inside and outside of the aforementioned case for free passage further in an ink cartridge according to claim 5 -- a hole -- having - - the 2nd sealant of the above -- the aforementioned air free passage -- a hole is also blockaded possible [ablation] if only the 2nd sealant of one field is exfoliated in case a recording head is equipped with a cartridge in a user side according to this composition -- an ink feed hopper -- an air free passage -- since opening also of the hole can be carried out, it uses and wins and ** is good

[0030]

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[Embodiments of the Invention] Hereafter, 1 operation form which materialized this invention is explained with reference to a drawing.

[0089] Drawing 1 shows the state where the ink cartridge by this operation form was connected to the recording head, the head electrode holder 50 which supported the recording head 72 is carried in the carriage 52 by which scanning movement is carried out along with a record medium, and it is equipped with an ink cartridge 1 removable at the head electrode holder 50. the ink feed hopper 17 which formed the ink cartridge 1 in the undersurface -- the joint by the side of the head electrode holder 50 -- a member 74 -- fitting in -- a manifold -- ink is distributed to many ink jet channels of a recording head 72 through a member 73 A recording head 72 spouts ink from each ink jet channel by driving the actuator which consists of a piezoelectric device or a heater element so that it may be well-known.

[0090] The ink cartridge 1 by the form of this operation consists of the case 2 built by transparent or translucent resin material in the shape of a rectangle, and the up-and-down covering device material 3 and 4. A case 2 consists of the 1st side attachment wall 2a and 2b of the couple which counters, and the 2nd side attachment wall 2c and 2d of the couple which connects between the side attachment walls of the couple, and it is making tubed [of the rectangle which opened the vertical ends side wide]. Heat welding of the up-and-down covering device material 3 and 4 is carried out so that vertical both the opening side of a case 2 may be worn. Furthermore, a case 2 is connected with the 1st side attachment

wall (it sets to drawing 3 and is a wall on either side) 2a and 2b, the bridge walls 5 and 6 mostly prolonged in parallel, and both the bridge-walls soffit of those, and partition formation of the interior is carried out by a bottom opening side, the bottom bridge wall 7 mostly prolonged in parallel, and the bridge walls 7a, 7b, and 7c perpendicularly prolonged towards a bottom opening side from the bottom bridge wall 7. Bridge walls 5 and 6, the bottom bridge wall 7, and bridge walls 7a and 7b are prolonged in mediation ***** in for the 2nd side-attachment-wall 2c and 2d.

[0091] The 1st locus 9 which opened the upper surface wide in the upper limit of a case 2 were formed in the place surrounded by bridge walls 5 and 6, the bottom bridge wall 7, and the 2nd side attachment wall 2c and 2d, and the porosity material 8, such as a polyurethane foam which absorbed ink, is held in it. The 2nd locus 10 are formed in the place of the 1st side attachment wall surrounded by 2a, a bridge wall 5, and the 2nd side attachment wall 2c and 2d on the other hand, and the air free passage way 11 is formed in the place surrounded by another side 2b of the 1st side attachment wall, a bridge wall 6, and the 2nd side attachment wall 2c and 2d. The 2nd locus 10 and air free passage way 11 opened the upper limit wide on the upper surface of a case 2, respectively, and bent the soffit along the undersurface of the bottom bridge wall 7, and have opened the soffit wide on the undersurface of a case 2.

[0092] The upper covering device material 3 covers the upper limit of the 1st locus 9, the 2nd locus 10, and the air free passage way 11, respectively, fixes by heat welding to the upper limit of side attachment walls 2a, 2b, 2c, and 2d and bridge walls 5 and 6, and is making each locus 9 and 10 and the path 11 become independent. The lower covering device material 4 covers the soffit of the 2nd locus 10 and the air free passage way 11, respectively, fixes by heat welding to the soffit of side attachment walls 2a, 2b, 2c, and 2d and bridge walls 7a and 7b, and is making the 2nd locus 10 and path 11 become independent. Consequently, the 2nd locus 10 and air free passage way 11 make about L typefaces from vertical section part 10a which meets side attachment walls 2a and 2b, and the level portions 10b and 11b located in the 1st locus 9 bottom. In addition, a part for a vertical section, 11a, and level partial 11b of the air free passage way 11 are open for free passage through the free passage mouth 30 prepared in bridge-wall 7b.

[0093] The run through-hole 15 which connects the 1st locus 9 and 2nd locus 10 is formed in the bottom bridge wall 7. Ink is held in the 1st locus 9 and 2nd locus 10, respectively, and the ink room is formed by both locus. When it comes to [both] the path at the time of ink restoration, the 2nd locus 10 turn into a relay room at the time of supplying ink to a recording head 72 from the 1st locus 9 so that it may mention later. The 1st locus 9 are formed greatly enough as compared with the 2nd locus 10. The air free passage way 11 supplies the atmosphere to the 1st locus 9, when the ink of the 1st locus 9 is consumed. Between the 2nd locus 10 and the air free passage way 11, bridge-wall 7a of the undersurface of the bottom bridge wall 7 dissociates. As mentioned above, in the both-sides section of a case 2, bridge walls 5 and 6 are mostly formed in parallel with side-attachment-wall 2a and 2B, and are increasing case intensity by making a flank into about 2-fold box-frame construction. Moreover, resin fabrication of the case 2 of such a configuration can be easily carried out with the metal mold separated up and down.

[0094] The ink restoration mouth 13 is formed corresponding to the upper-limit opening side of the 2nd locus 10, and the upper-limit opening side of the 1st locus 9 is countered, and the reduced pressure mouth 14 for decompressing the inside of a case at the time of ink restoration is formed in the upper covering device material 3. the above-mentioned free passage which opens the 2nd locus 10 and 1st locus 9 for free passage mutually -- a hole 15 is arranged at an opposite side, it gathers the charging efficiency of ink so that it may mention later, and it is made, as for an edge, i.e., **, side distant from the side in which the ink restoration mouth 13 and the reduced pressure mouth 14 are arranged, to gather the consumption efficiency of ink

[0095] Moreover, the 1st locus 9 and air free passage way 11 are opened for free passage by the path 16 formed in it as straddled the upper limit of a bridge wall 6 to the upper covering device material 3. That is, a path 16 is formed in the upper surface of the upper covering device material 13 at a concave, the end is opened for free passage by the 1st locus 9 through the reduced pressure mouth 14, and the other end is opened for free passage by the air free passage way 11 through penetration mouth 16a. The upper covering device material 13 has the wall 27 which projects in the 1st locus 9 and contacts the upper surface of the porosity material 8. That is, in the 1st locus 9 and a corresponding portion, the upper covering device material 3 was formed thickly, and has compressed the ink absorber 8 a little. A wall 27 opens the 1st inside and interval of locus 9 so that it may mention later, and the reduced pressure mouth 14 is located inside the 1st locus 9 rather than the periphery of the wall 27.

[0096] corresponding to the soffit opening side of the 2nd locus 10, the ink feed hopper 17 for supplying the ink of the 2nd locus 10 to a recording head forms in the lower covering device material 4 -- having -- the soffit opening side of the air free passage way 11 -- corresponding -- an air free passage -- the hole 18 is formed, respectively As shown in drawing 6, the run through-hole 15 and the ink feed hopper 17 shift mutually, in view of a flat surface, it is located, and the rib-like obstruction 31 is formed on the shortest path which connects the run through-hole 15 and the ink feed hopper 17 to the 2nd locus 10. This obstruction 31 is made to protrude on one from the bridge wall 7 of a case 2, and although it is desirable to form by making it join to the internal surface of the lower covering device material 4, even if

it makes it make it protrude on one from the lower covering device material 4, it does not interfere. 7d (drawing 3) of inferior surfaces of tongue of the pars-basilaris-ossis-occipitalis bridge wall 7 -- a free passage -- it is an inclined plane so that it may go up toward a part for the vertical section of the 2nd locus 10 from the soffit of a hole 15 One edge of the above-mentioned obstruction 31 was located in the flank of the run through-hole 15, and the other end is prolonged till the place near a part for the vertical section of the 2nd locus 10. When this draws ink from the 2nd locus 10 with the negative pressure produced by ink jet from a recording head 72, the ink style which came out of the run through-hole 15 from the 1st locus 9 bypasses an obstruction 31 like an arrow 32, goes into level partial 10b of the 2nd locus 10 again through vertical section part 10a of the 2nd locus 10, and results in the ink feed hopper 17.

[0097] As shown in drawing 4, the ink restoration mouth 13 and the reduced pressure mouth 14 are blockaded by the 1st sealant 21 and 22 stuck on the superficies of the upper covering device material 3 by heat welding etc. after ink restoration. The sealant 22 secured the path 16 and is wearing the upper surface. It is blockaded by the 2nd sealant 23 on which the air run through-hole 18 is stuck by heat welding etc. possible [ablation] as the ink feed hopper 17. Since the ink restoration mouth 13 and the ink feed hopper 17 are another, the 2nd sealant 23 is beforehand stuck on the ink feed hopper 17 before restoration of ink. For this reason, since it does not say that the surroundings of the ink feed hopper 17 have got wet in the ink at the time of restoration like the conventional thing to which the ink feed hopper 17 serves as the ink restoration mouth 13, even if it is weak heat welding which is the grade which does not deform an ink feed hopper, sufficient seal effect can be acquired. Since sealants 21 and 22 do not need to exfoliate, they may carry out heat welding firmly to the grade which deformation produces somewhat in the upper covering device material 3. Each sealants 21, 22, and 23 are built with the resin, the metallic foils, or those charges of plywood of air impermeability.

[0098] The reticulated filter 24 made from stainless steel is attached in the field by the side of the 2nd locus 10 of the ink feed hopper 17. It has the opening of the grade to which the ink in the 2nd locus 10 does not leak this filter 24 in the natural state with surface tension.

[0099] As shown in drawing 10, in the middle of vertical section part 11a of the air free passage way 11, the bridge wall 29 which divides the air free passage way 11 up and down is formed. The bridge wall 29 had the difference of elevation in the vertical direction of the air free passage way 11, and is prolonged, a through hole 28 is formed in the high portion, and the crevice which becomes ink ** 29a from the upper-limit side of the through hole 28 in a low position is formed. In case a bridge wall 29 carries out resin fabrication of the case 2, it can be fabricated by the lever section of the metal mold separated up and down, and does not need special processing.

[0100] moreover, the air free passage of the lower covering device material 4 -- ink ** 4a is formed in the circumference also by protruding peripheral wall 18a of a hole 18 on tubed up an ink cartridge falls by this -- carrying out -- the 1st locus 9 to the path 16 -- ** -- the ink which leaked later on collects on ink ** 29a Moreover, even if the ink in ink ** 29a may go into a through hole 28 by leaning an ink cartridge etc., it collects on ink reservoir 4a of the lower part. therefore, the air free passage way 11 and an air free passage -- a hole 18 is not closed or ink does not leak outside

[0101] As shown in drawing 6 and drawing 19, the level portions 10b and 11b of the 2nd locus 10 and the air free passage way 11 are adjoined, and space 33 is formed in the case 2. Space 33 is divided by bridge-wall 7a and bridge-wall 7c between which it mediated among 7b, it is covered by the lower covering device material 4, and does not open the undersurface for free passage in the 2nd locus 10, the 1st locus 9, and the air free passage way 11, but is open for free passage with the case exterior with the puncturing 34 which prepared in the lower covering device material 4. On the occasion of shipment, the ink cartridge 1 filled up with ink is made into the state where sealing hold was carried out in the state of reduced pressure into the packing bag 81, as shown in drawing 19. The packing bag 81 contains an ink cartridge 1 inside tubed part material, and it carries out both the openings edge welding 82 while it carries out negative pressure suction of the interior. The packing bag 81 is built with the resin, the metallic foils, or those charges of plywood of air impermeability. The cross section of the ink cartridge 1 shown by drawing 19 is equivalent to the C-C line cross section of drawing 9. Puncturing 34 is not covered by the 2nd sealant 23. When the inside of the packing bag 81 is made into a reduced pressure state, the above-mentioned space 33 makes the inside of space 33 a reduced pressure state similarly, and it acts so that the inside of the sealing packing bag 81 may be maintained in the reduced pressure state over a long period of time with the capacity. This prevents the air infiltration to the ink within a case in the intact state.

[0102] Drawing 11, drawing 12, and drawing 13 show the composition of path 16 portion in detail. The composition shown in drawing 11 is created as reference for explaining a trouble. Path 16b penetrates the upper covering device material 3, is formed, and is making the 1st locus 9 and air free passage way 11 open for free passage mutually in this drawing. Although the upper surface of path 16b is not illustrated, it is being worn by the sealant 22. In such a case, ink tends to gather for the bridge wall 6 and side attachment walls [2c and 2d] edge (ridgeline) E1 to make and the edge

E2 which a bridge wall 6 and the upper covering device material 3 make by capillarity. And since the above-mentioned edges E1 and E2 are following the edge E3 of the inside of path 16b, and a bridge wall 6 to make, the ink gathering in the above-mentioned edges E1 and E2 flows on an edge E3 by capillarity, as Arrow R shows, and they flow out along with the edge E4 in the air free passage way 11 further. When ink infiltrates into the direction of the air free passage way 11 from the 1st locus 9, and a case is transparent or translucent, it will become unsightly, and further, it leaks out to the case exterior, or the air free passage way 11 is taken up, and there is fault the ink supply to a recording head 72 from the 1st locus 9 becomes impossible.

[0103] As shown in drawing 12, in order to cancel the above-mentioned fault, the periphery of the above-mentioned wall 27 jutted out of the upper covering device material 3 over the 1st locus 9 side has set the 1st inside and interval K of locus 9. The reduced pressure mouths 14 are a cylindrical shape, a rectangle with the radius of circle, etc., and are located in nothing and the edge distant from the bridge wall 6 of a wall 27 in the configuration which does not have an edge in an inside. By this composition, the inside edge by the side of the 1st locus 9 of a bridge wall 6 is not connected with a path 16 and the air free passage way 11 only with the inside edge which two flat surfaces make. That is, the inferior surface of tongue of a wall 27, the periphery of a wall 27, and the inside of the reduced pressure mouth 14 are configurations without the inside edge which two flat surfaces make, and the inside edge by the side of the 1st locus 9 of a bridge wall 6 will be connected with the air free passage way 11 through these field sections. Therefore, it is prevented that the ink in which the wall 27 carried out compressing the porosity material 8 etc., and oozed, and the ink gathering in the inside edge by the side of the 1st locus 9 flow into the path 16 and air free passage way 11 side by capillarity. Moreover, since there is no inside edge, the reduced pressure mouth 14 is moreover located in the heavy-gage part of the upper covering device material 3 and there is height of enough of the reduced pressure mouth 14 also in the inside of the reduced pressure mouth 14 which touches the porosity material 8, it is also prevented that the ink in the porosity material 8 trespasses the inside of the reduced pressure mouth 14 upon the ***** path 16. Temporarily, the crevice between the periphery of a wall 27 and a bridge wall 6 is small, and even if ink may go up the crevice by capillarity, since the upper limit of a bridge wall 6 is welded at the covering device material 3, ink does not trespass upon the air free passage way 11.

[0104] In addition, when the reduced pressure mouth 14 is made into the configuration which has an edge in an inside, the effect same also as cross-section configurations without an edge, such as a rectangle with the semi-cylindrical shape or the radius of circle, is acquired in the inside of a path 16.

[0105] Drawing 13 shows the composition which improved the circulation space further, and in drawing 12, the reduced pressure mouth 14 is formed, without touching a wall 27 between the periphery of a wall 27, and a bridge wall 6, although the wall 27 was penetrated. That is, since the inside of the reduced pressure mouth 14 has set space, without contacting the porosity material 8 directly, it is prevented further that the ink in the porosity material 8 carries out ***** exsorption of the inside of the reduced pressure mouth 14.

[0106] Moreover, the ink residue detection sensor 60 is formed in the carriage 52 of an ink jet printer. Namely, although ink is full in the state of [intact] the ink cartridge 1, without leaving space in the porosity material 8 in the 1st locus 9, and the 2nd locus 10 If ink is consumed by record operation and the ink in the 1st locus 9 is lost, with the pressure to which a recording head 72 attracts ink, air will invade into the 2nd locus 10 from the 1st locus 9, an opening portion will arise above the 2nd locus 10, and an ink oil level will fall. The ink residue detection sensor 60 detects the existence of an ink residue from change of reflection of the light by the existence of the ink in the paries-medialis-orbitae side of these 2nd locus 10.

[0107] The aforementioned ink residue sensor 60 carries out outgoing radiation of the light to the detecting-element grade alpha set as the predetermined height position of side-attachment-wall 2a which a light emitting device 61 faces the 2nd locus 10 of a case 2, as shown in drawing 1. On both sides of the detecting-element grade alpha, a light emitting device 61 and a photo detector 62 open a predetermined interval in the horizontal direction of the 2nd locus 10, and are arranged in it so that a photo detector 62 (drawing 5) can receive the reflected light from the side-attachment-wall inside in the detecting-element grade alpha. Because of this purpose, if the case 2 is transparent or translucent in order that a detecting-element grade alpha portion may secure a translucency at least, it is good.

[0108] Moreover, the aforementioned detecting-element grade alpha is set as the ridgeline portion (corner portion) prolonged in the vertical direction formed when the inside of 2d of side attachment walls which adjoin in 2nd room 10 of an ink cartridge 1 at the inside of side-attachment-wall 2a and it crosses, as shown in drawing 5. Thus, if the detecting-element grade alpha is set as the ridgeline portion (corner portion) of the 2nd locus 10, so that it may mention later When the height of the oil level of the ink in the 2nd locus 10 falls rapidly from level h1 to level h2, as shown in drawing 14 The ink L which had adhered near the corner section of a side-attachment-wall 2a inside though the ink L adhering to the side-attachment-wall 2a inside was held to the level h1 neighborhood in the center section of side-attachment-wall 2a The same existence of the ink in the level h 2nd locus 10 in the detecting-element grade

alpha since it moves immediately to about two as the height of an ink oil level is detectable with a sufficient precision with the capillarity which a corner portion has. Thus, an oil level's falling rapidly is connecting to a recording head 72 the suction means it being well-known in the ink oil level h2 shaking to h1 for injection functional recovery of a recording head 72, with scanning movement of carriage, and attracting a lot of ink, and it is the case where an ink oil level falls rapidly.

[0109] Moreover, although it is also possible to set the detecting-element grade alpha as the ridgeline portion which prepares the rib which projects in the 2nd locus 10 from a side-attachment-wall 2a inside, and is prolonged in the height direction of the 2nd locus 10, and is formed of this rib and a side-attachment-wall 2a inside The detection precision by the ink residue sensor 60 can be raised without complicating structure of an ink cartridge 1 by setting the detecting-element grade alpha as the corner portion which exists in the usual ink cartridge, as mentioned above.

[0110] Moreover, the futility of the ink generated in case the ink residue at the time of exchanging an ink cartridge 1 can be made small as much as possible and an ink cartridge 1 is exchanged by detecting the ink residue of the 2nd locus 10 in which oil-level change of ink appears at the end by the ink residue sensor 60 after consuming the ink of the 1st locus 9 mostly as mentioned above can be stopped to the minimum.

[0111] moreover, to the inside of side-attachment-wall 2a which attends the 2nd locus 10 to which the detecting-element grade alpha is set as shown in drawing 15 The direction which intersects perpendicularly with a light emitting device 61 and a photo detector 62, and the flat surface containing the detecting-element grade alpha, namely, on the superficies of side-attachment-wall 2a to which many detailed concave protruding lines 63 prolonged in the vertical direction of an ink cartridge 1 are formed in, and the detecting-element grade alpha is set Many detailed concave protruding lines 64 prolonged to a light emitting device 61 and a photo detector 62, the flat surface containing the detecting-element grade alpha, and a parallel direction, i.e., the cross direction of an ink cartridge 1, are formed.

[0112] In the state where ink exists to the height of the detecting-element grade alpha of the 2nd locus 10, the light by which outgoing radiation was carried out from the light emitting device 61 progresses into ink from the refractive index of side-attachment-wall 2a and ink (arrow B), and hardly progresses to a photo-detector 62 side. And in the state where there is no ink in the detecting-element grade alpha, it reflects by the inside of side-attachment-wall 2a, and light progresses toward a photo detector 62. Under the present circumstances, if many detailed concave protruding lines 63 prolonged in the vertical direction in the inside of side-attachment-wall 2a of the case main part 11 are formed, as a solid line shows to drawing 15 When the light by which outgoing radiation was carried out from the light emitting device 61 reflects by the inside of side-attachment-wall 2a of the case main part 11, It is mostly scattered about horizontally (direction parallel to a light emitting device 61 and a photo detector 62, and the flat surface containing the detecting-element grade alpha) by this concave protruding line 63, and it progresses to the photo-detector 62 side, spreading within the flat surface containing the detecting-element grade alpha of the light emitting device 61 of a sensor 60 and a photo detector 62, and the aforementioned case 2. The reflected light in case the concave protruding line 63 is not formed in the inside of side-attachment-wall 2a is shown in this drawing with a two-dot chain line.

Therefore, as a solid line and a two-dot chain line show to drawing 16, even when the distance between a sensor 60 and the detecting-element grade alpha changes delicately, a photo detector 62 can receive the reflected light certainly. That is, even when the attaching position to the carriage 52 of a sensor 60 varies in the manufacture stage of an ink jet printer or the wearing position of an ink cartridge 1 shifts delicately on the occasion of exchange of the ink cartridge 1 by the user, detection of an ink residue can be ensured. In addition, drawing, although light illustrated for convenience in the state of explanation of changing outgoing radiation into an parallel state from a light emitting device 61, that by which outgoing radiation is carried out so that it may spread can also attain the same effect.

[0113] Moreover, if many detailed concave protruding lines 64 prolonged on the superficies of side-attachment-wall 2a at a cross direction are formed as mentioned above, as shown in drawing 17 The light reflected by the appearance of side-attachment-wall 2a of a case 2 is scattered about in the vertical direction by the concave protruding line 64. Since it progresses to the photo-detector 62 side while the reflected light in the superficies of side-attachment-wall 2a spreads on the outside of the flat surface containing the light emitting device 61 of a sensor 60 and a photo detector 62, and the detecting-element grade alpha, a photo detector 62 stops easily being able to receive the reflected light in the superficies of side-attachment-wall 2a which does not contribute to detection of an ink residue. Therefore, the ratio of the reflected light component in the inside of side-attachment-wall 2a which contributes to detection of an ink residue among the reflected lights which a photo detector 62 receives becomes high, and the detection precision of an ink residue improves. When the concave protruding line of the inside of side-attachment-wall 2a is what is prolonged horizontally and the distance of a sensor 60 and the detecting-element grade alpha changes temporarily as shown in drawing 16 since light is scattered about in the vertical direction, the permission position where a photo detector 62 can receive the reflected light is remarkably restricted as compared with the above-mentioned operation gestalt.

[0114] Although the case 2 constituted as mentioned above is fabricated by metal mold the metal mold corresponding

to the inside of side-attachment-wall 2a to which, as for the metal mold used, the detecting-element grade alpha is set, while the field is polished in the direction which intersects perpendicularly with the flat surface containing a light emitting device 61 and a photo detector 62, and the detecting-element grade alpha the metal mold corresponding to the superficies of side-attachment-wall 2a to which the detecting-element grade alpha is set -- a field polishes in parallel to the flat surface containing a light emitting device 61 and a photo detector 62, and the detecting-element grade alpha -- having -- **** -- metal mold -- by applying such polishing to a field each metal mold -- many detailed concave protruding lines prolonged in the predetermined direction are formed in a field Therefore, by using such metal mold, as mentioned above, the ink cartridge 1 in which the concave protruding lines 63 and 64 of a large number prolonged in the predetermined direction, respectively on the inside and external surface of side-attachment-wall 2a to which the detecting-element grade alpha is set were formed can be manufactured easily.

[0115] In addition, although the light emitting device 61 and the photo detector 62 are horizontally arranged with the form of this operation, it is also possible for it not to be limited to this and to arrange a light emitting device 61 and a photo detector 62 in the vertical direction of an ink cartridge 1. However, you have to make reverse the sense of the concave protruding lines 63 and 64 formed in the inside-and-outside side of side-attachment-wall 2a in that case, respectively.

[0116] Next, if the manufacture method of an ink cartridge 1 is explained, first, resin fabrication of the case 2 is carried out, and the case 2 will be washed and it will dry. Since the vertical ends side is wide opened at this time, a case 2 can be easily fabricated with the metal mold separated up and down. Although it is often necessary to wash a case so that the physical properties of ink may not change, in the configuration of this case, a penetrant remover tends to reach the interior and can wash it easily. Moreover, dryness can also be performed, without leaving a penetrant remover.

[0117] And as shown in drawing 4, the porosity material 8 is inserted in the 1st locus 9 from the top open end of a case 2, and by pressing this porosity material 8 by the upper covering device material 3, it changes into a compression state and holds. Heat welding of the upper covering device material 3 is carried out at the upper limit of the upper-limit opening periphery of a case 2, and bridge walls 5 and 6. Moreover, the lower covering device material 4 carries out heat welding, and is fixed to the soffit of the soffit opening periphery of a case 2, and bridge walls 7a, 7b, and 7c. A sealant 23 is stuck on ink feed-hopper [of the lower covering device material 4] 17, and air run through-hole 18 portion possible [exfoliation] so that these may be covered. Thus, the upper and lower sides of a case 2 are mostly formed in the shape of opening, various kinds of above locus can be formed by equipping this with the covering device material 3 and 4 from the upper and lower sides, and these attachment is easy. Moreover, since the air run through-hole 18 is located in a line with the whole surface of a cartridge as the ink feed hopper 17, it is not necessary to take about the wrap sealant 23 along with the periphery of a cartridge like before, and they can be stuck easily.

[0118] Furthermore, when ink restoration work into an ink cartridge 1 is explained, as it is shown in drawing 18, where the seal of the air run through-hole 18 is carried out to the ink feed hopper 17 of the lower covering device material 4 as mentioned above, ink restoration equipment 101 is stuck to the ink restoration mouth 13 of the upper covering device material 3, a decompression device 102 is stuck to the reduced pressure mouth 14, and it carries out by operating each equipment. Since the ink restoration mouth 13 and the reduced pressure mouth 14 are located in a line with the whole surface of a cartridge, each equipment of both should just approach from the one side of an ink cartridge 1. The air in the 1st locus 9 is attracted from the reduced pressure mouth 14 in advance of ink restoration. The 1st and 2nd locus 9 and 10 are decompressed, ink passes along the 2nd locus 10 from the ink restoration mouth 13, and the porosity material 8 in the 1st locus 9 is filled up with it from the run through-hole 15 by it. Since it results in the run through-hole 15 and the reduced pressure mouth 14 which separated most after the 2nd locus' 10 serving as an ink restoration way, and ink's going into the 2nd locus 10 from an end, passing along it and the run through-hole 15 left most at this time and going into the 1st locus 9 While the 2nd locus 10 the very thing is also filled up with ink at full, both the 1st locus 9 can also be efficiently filled up with ink. Moreover, as mentioned above, since the flank of a case 2 serves as double box-frame construction and it is reinforced, it is rare in the case of reduced pressure for a case 2 to deform, and this meaning can also fill up both the locus 9 and 10 with ink efficiently at it. In addition, the inside of the air free passage way 11 is also decompressed simultaneously with the 1st locus 9, and after sticking a sealant, it is maintained by the reduced pressure state.

[0119] What removed the foam with which the ink filled up with the above-mentioned process is dissolved in ink, and air as much as possible (the deaerated so-called ink) is used. This is for avoiding that a foam and air invade into a recording head 72, and produce poor injection of ink. Moreover, reduced pressure seal of the ink cartridge 1 is carried out for preventing that a foam and air melt into the deaerated ink again with the packing bag 8 as mentioned above.

[0120] Sealants 21 and 22 are stuck on the ink restoration mouth 13 and the reduced pressure mouth 14 after ink restoration. Sealants 21 and 22 should leave only a respectively required portion, after sticking one sealant. Thus, since what is necessary is to bring restoration equipment 101 and a decompression device 102 close from one side to a case

2, and just to carry out a seal from one side to a case 2 in a manufacture stage, workability is good.

[0121] In this way, as mentioned above, in the packing bag 81, the manufactured ink cartridge 1 is shipped, where sealing hold is carried out in the state of reduced pressure.

[0122] the time of use of the ink cartridge 1 in a user -- a user -- the ink feed hopper 17 of an ink cartridge 1, and an air free passage -- the sealant 23 stuck on the hole 18 -- removing -- the ink feed hopper 17 -- the manifold 73 of a recording head 72 -- joint -- it is made to join together through a member 74 And a suction means is connected to a recording head 72, and a recording head 72 is filled up with ink from an ink cartridge 1 so that it may be well-known.

[0123] Negative pressure is made to act with the absorptive power of the porosity material 8 in the 1st locus 9, i.e., capillarity, from the 2nd locus 10 to the ink supplied to a recording head 72 during record operation. The actuator of a recording head 72 is carrying out ink jet operation, generates negative pressure in the jet direction, and attracts ink from an ink cartridge 1. if the ink in the 2nd locus 10 flows out of the ink feed hopper 17, ink will supply in the 2nd locus 10 from the porosity material 8 in the 1st locus 9 -- having -- consumption of the ink in the 1st locus 9 -- following -- an air free passage -- pass the air free passage way 11 from a hole 18 -- the atmosphere is introduced into the 1st locus 9 Since the upper limit of the 2nd locus 10 is closed by the sealant 21, since atmospheric pressure does not work in the ink of the 2nd locus 10, after the ink in the 1st locus 9 is consumed mostly, the ink in the 2nd locus 10 comes to be consumed in the state where full restoration of the ink is carried out at the 2nd locus 10. That is, with the pressure to which a recording head 72 attracts ink, if the ink in the 1st locus 9 is lost, while the ink of the 2nd locus 10 is consumed, air will invade into the 2nd locus 10 from the 1st locus 9, an opening will arise from the upper part for a vertical section 10 of the 2nd locus 10, and an ink oil level will fall.

[0124] Thus, since the atmosphere is introduced from a side with the far run through-hole 15 in the 1st locus 9, while the ink of the 1st locus 9 is used effectively, the whole ink also including the ink of the 2nd locus 10 is used effectively. Moreover, since full is filled up from the beginning as an ink restoration way, the 2nd locus 10 are not incorrect-detected in restoration insufficient shell residue detection of the ink here. Since the work which furthermore removes a sealant 23 is also only the whole surface of a cartridge, it is easy.

[0125] Moreover, as mentioned above, when an obstruction 31 is between the run through-hole 15 and the ink feed hopper 17 When ink is drawn in the 2nd locus 10 through the run through-hole 15 by the pressure to which a recording head 72 attracts ink from the 1st locus 9, When the foam was mixing into the ink, or the ink of the 1st locus 9 is consumed as mentioned above and air comes to be drawn in the 2nd locus 10, it can prevent that the foam and air flow into a recording head 72. That is, as an arrow 32 shows, when an ink style bypasses an obstruction 31 to drawing 6, a foam and air escape to the upper part of the vertical section part 10a by buoyancy, and are not given to the ink feed hopper 17 in the place corresponding to vertical section part 10a of the 2nd locus 10. 7d of ceiling sides of level partial 10b of the 2nd locus, i.e., the inferior surface of tongue of the pars-basilaris-ossis-occipitalis bridge wall 7, -- a free passage -- a foam and air flow to the upper part of vertical section part 10a by inclining so that it may go up toward vertical section part 10a of the 2nd locus 10 from the soffit of a hole 15, without remaining in the inferior surface of tongue of the pars-basilaris-ossis-occipitalis bridge wall 7 Therefore, a foam and air can invade into a recording head 72, and a bird clapper can be prevented to poor ink jet.

[Brief Description of the Drawings]

[Drawing 1] The cross section in the state where the ink cartridge by the gestalt of 1 operation of this invention was carried in the recording head.

[Drawing 2] The external view of an ink cartridge.

[Drawing 3] The cross section of an ink cartridge.

[Drawing 4] The decomposition cross section of an ink cartridge.

[Drawing 5] The B-B cross section of drawing 1.

[Drawing 6] The bottom view of the case except the lower covering device material of an ink cartridge.

[Drawing 7] The plan before seal pasting of the upper covering device material of an ink cartridge.

[Drawing 8] The plan after seal pasting of the upper covering device material of an ink cartridge.

[Drawing 9] The bottom view of an ink cartridge.

[Drawing 10] The A-A line cross section of drawing 4.

[Drawing 11] The perspective diagram expanding and showing the composition of the path 16b portion between the 1st locus and an air free passage way.

[Drawing 12] The perspective diagram expanding and showing the composition which improved the circulation space of drawing 11.

[Drawing 13] The perspective diagram expanding and showing the composition which improved the circulation space of drawing 11 further.

[Drawing 14] The side elevation of an ink cartridge.

[Drawing 15] The horizontal sectional view showing notionally the reflective state of the light in ink residue detecting-element grade.

[Drawing 16] The horizontal sectional view showing notionally the reflective state of the light in ink residue detecting-element grade.

[Drawing 17] The vertical cross section showing notionally the reflective state of the light in ink residue detecting-element grade.

[Drawing 18] Explanatory drawing showing the ink restoration work of an ink cartridge.

[Drawing 19] The cross section in the state where the ink cartridge was held in the packing bag.

[Description of Notations]

1 -- Ink cartridge.

2 -- Case.

3 -- Up covering device material.

4 -- Bottom covering device material.

5, 6, 7 -- Bridge wall.

8 -- Porosity material.

9 The 1st locus.

10 -- The 2nd locus.

11 -- Air free passage way.

13 -- Ink restoration mouth.

14 -- Reduced pressure mouth.

15 -- Run through-hole.

16 -- Path.

17 -- Ink feed hopper.

18 -- Air run through-hole.

21 22 -- The 1st sealant.

23 -- The 2nd sealant.

29a, 4a -- Ink reservoir.

31 -- Obstruction.

33 -- Space.

60 -- Ink residue detection sensor.

81 -- Packing bag.

[Procedure amendment 2]

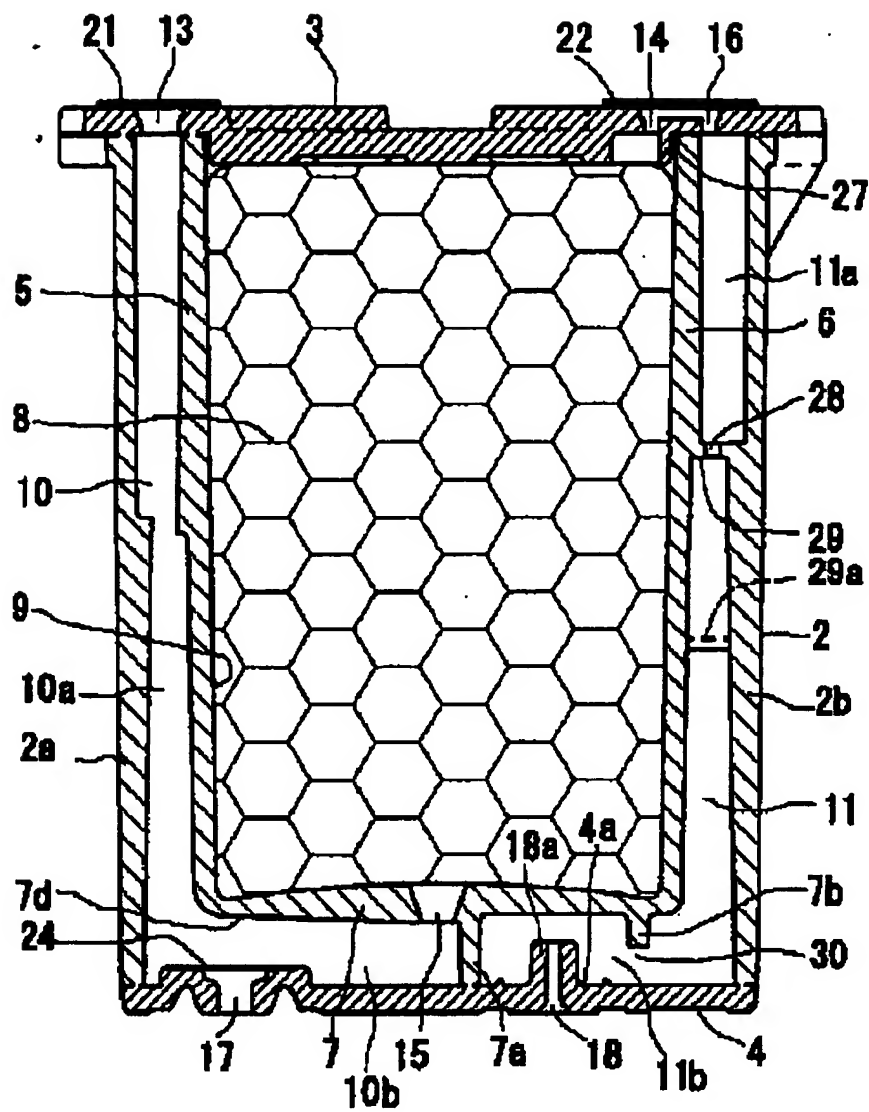
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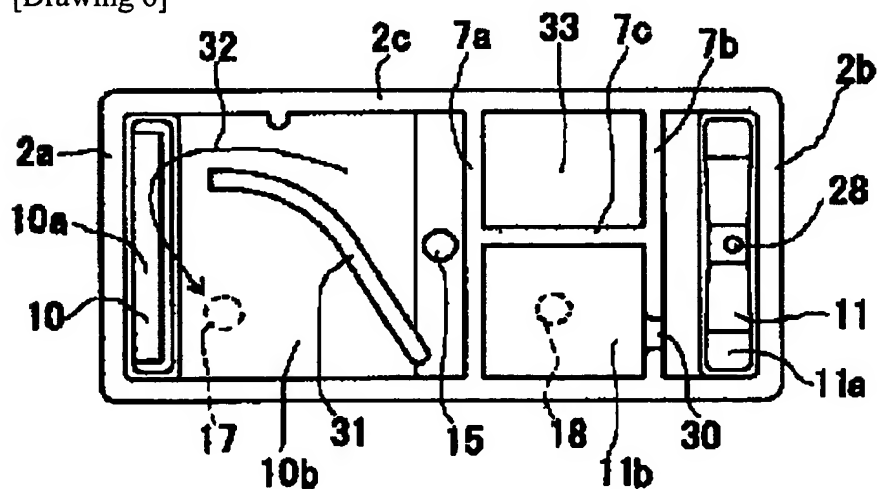
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[Drawing 3]



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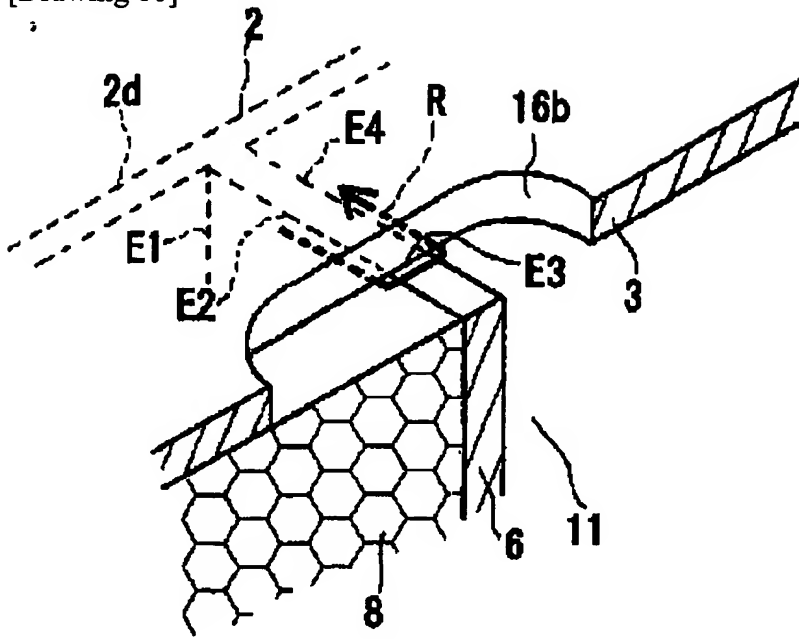


[Procedure amendment 4]
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 [Item(s) to be Amended] Drawing 11.

[Method of Amendment] Change.

[Proposed Amendment]

[Drawing 11]



[Translation done.]